- - - - Index to CONTENTS, June, 1933 - - - -

In place of the usual Semi-Annual Index, the Index for the year 1933 will appear in the December issue

Bridges and Culverts
The Old and the New in Culverts..... 11
High-Level Bridge, Hamilton, Ont..... 95

City Manager Government
Recent City Manager Appointments..... 73

City Planning and Zoning
Fire Safety Provisions Will Help Sell City Planning and Zoning to Taxpayers..... 55
Land Occupancy and Real Estate Valuation Trends Studied 71
McKeesport Utilizes the Depression to Plan for the Future..... 71
Zoning and Planning Notes..... 73

Conservation
Iowa Conservation Plan Aids Conservation Corps Work 73

Conventions
When and Where..... 81

Finance
Taxes and "The Little Old Home Town". 56
America's First Municipal Enclave of Economic Rent 58
Tax-Gatherers More Needed Than Budget-Slashers 61
Land Occupancy and Real Estate Valuation 71
Progress Towards Sound Tax Methods.... 72
Michigan Limit Inapplicable to Home Rule Cities 72
Sales Tax Laws Declared Unconstitutional. 72
New York Abolishes Personal Property Tax 72
The Municipal Bond Market..... 73

Fire Prevention and Control
Lowering Fire Losses..... 17
Fire Safety Provisions Will Help Sell City Planning and Zoning to Taxpayers..... 55

Forward Steps
Items Contributed by Officials..... 70

Health
Swimming Pool Sanitation..... 83

Housing
Federal Aid for Housing..... 5
The Menace in Outworn Dwellings..... 69
Housing Survey Stirs Action in Delaware. 75

Legal Decisions
The City's Legal Rights and Duties..... 76

Memorials
Magnolia Trees as a Memorial..... 54

News and Illustrations
Hints for Officials..... 83

Outdoor Lighting
Survey of Municipal Lighting Plants..... 87
Beauty and Economy with Concrete Lighting Standards 93
Lighting High-Level Bridge, Hamilton.... 95
Gaseous Discharge Lamps for Highway Lighting 95

Parks and Recreation
A Dump That Pays a Dividend..... 70
A Parking Charge to Finance Beach Protection 71
Hydrant Attachment Makes Street Shower. 91

Police
Guarding and Guiding Visitors to the Chicago Fair 17

Power Plants
Diesel Engines from 250 to 1,000 Hp... 87
Pumping Equipment at A Century of Progress Exposition 91

Publications
Book and Pamphlet Notices..... 77

WANTED

Applications to the Federal Government from municipalities for their share of the $3,300,000,000 soon available for public works and housing.

(See page 5 of this issue)

VOL. XLVIII No. 6 — JUNE 1933

The American City

ISSUED MONTHLY BY THE
American City Magazine Corporation
470 Fourth Ave., New York

EDGAR J. BUTTENHEIM, Pres. and Mgr.
HAROLD S. BUTTENHEIM, Editor
THEODORE R. KENDALL
Secretary and Engineering Editor
M. V. FULLER
Associate Editor
HERBERT K. SAXE
Treasurer
PRENTICE C. FORD, Asst. to President — MYRON MacLEOD, Advertising Manager

•

BRANCH OFFICES
Daily News Building, Chicago
TOM DIX, Vice-President
642 Hanna Building, Cleveland
GEORGE S. CONOVER, Manager
402 Monadnock Bldg., San Francisco
DUNCAN A. SCOTT, Representative

•

Subscription, $2 per annum
($3 to Canada and foreign countries)
Single copies, 35c
Back numbers available

Entered as second-class matter, July 29, 1910, at the Post Office at New York, N. Y., under Act of March 3, 1879.
Printed in U. S. A.

•

In THE MUNICIPAL INDEX (the annual reference volume of data and condensed catalogs published by the American City Magazine Corporation) readers will find much material, including lists, and articles on a wide variety of municipal and civic subjects, not published in the monthly issues of the magazine.

Public Utilities
Supreme Court Approves Lower Public Utility Rates 45

Public Works
Substantial Federal Aid for Public Works and Housing 5
German Standards for Underground Installations 11
A New Tandem Axle Machinery Trailer.. 83
A Tractor Derrick for Handling Materials in Yards and Depots..... 89
Personnel on Boulder Canyon Project.... 89

Sewers and Sewage Disposal
Fighting the Psychoda..... 13
Building Sewer Siphons without Cofferdams 13
Building Sewage Works..... 13
What Charges for Sewerage Service?..... 68
Large Gas Engine Run on Sewage Sludge Gas 83

Streets and Highways
A Typical Hot-Mix Resurfacing Job..... 44
Highway Planning for Counties..... 52
Bituminous Surface Treatments Mean More Than They Did a Decade Ago..... 59
Roadways in New Orleans City Park Extension 70
A Cart Type Bituminous Distributor..... 85
A New Stone Spreader..... 87
A New Emulsion and Cold Patch Pump.. 89

Street Signs
A Synthetic Resin for Street Signs..... 89

Swimming Pools
Swimming Pool Sanitation..... 83

Traffic
Traffic Signals on Ohio Roads..... 17
A Parking Charge to Finance Beach Protection 71
Massachusetts Studies Traffic in Cities with Bad Accident Record..... 74
Reflecting Safety Zone Signals..... 83
Washington, D. C., Orders Traffic Control Equipment 87
A New Clearly Visible Highway Guard.... 87

Trees
Designed Spacing of Street Trees Would Decrease Costs 54
Magnolia Trees as a Memorial..... 54

Unemployment Relief
Unemployed Labor Used to Increase Water Supply in Bristol, Conn..... 46
Unemployed Build Two Roadways in New Orleans City Park Extension..... 70
A Dump That Pays a Dividend..... 70
Iowa Conservation Plan Aids Conservation Corps Work 73

Waste Collection and Disposal
In Various Places..... 15
An Attack on the Problem of the Disposal of Household Wastes—I..... 51
A Dump That Pays a Dividend..... 70
Reducing Refuse Collection and Haulage Costs 85

Water Supply and Water Works
Water Department Regulations..... 7
A 36-Inch Cast Iron Water-Supply Line.. 7
Lead Services in Milwaukee..... 7
Meters Check Losses..... 9
Developments and Improvements in a Borough Water Supply..... 41
Unemployed Labor Used to Increase Water Supply in Bristol, Conn..... 46
The Place of Powdered Activated Carbon in Water Purification..... 49
Pumps and Their Places—I..... 62
The Water Supply of Staunton, Va..... 65
Measuring Chemical Solutions..... 85
Manufacture and Sale of Meters in Canada 91

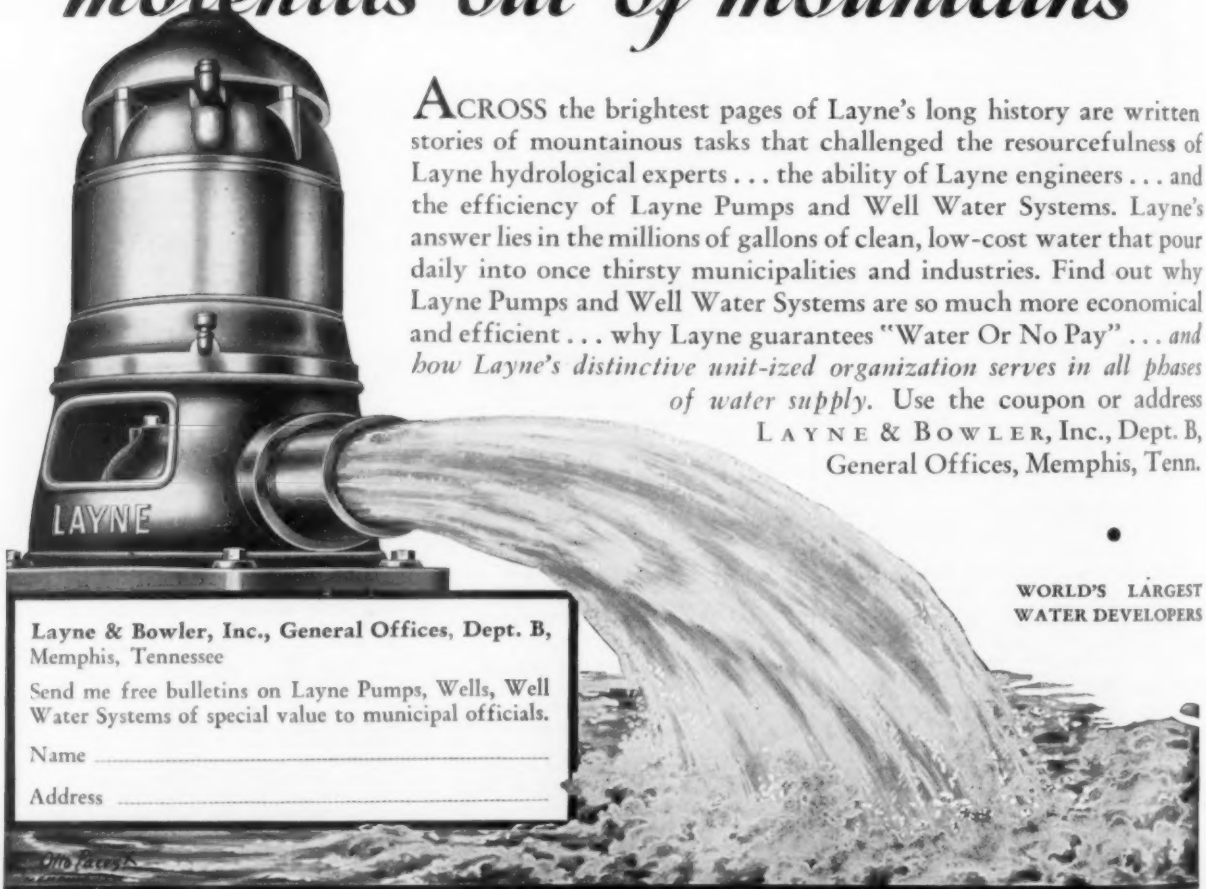
See pages 26, 77, 79 for notices of catalogs and publications on municipal and civic subjects

For Index to Advertisements see page 102

FIFTY YEARS

1883 OF MAKING 1933

molehills out of mountains



ACROSS the brightest pages of Layne's long history are written stories of mountainous tasks that challenged the resourcefulness of Layne hydrological experts . . . the ability of Layne engineers . . . and the efficiency of Layne Pumps and Well Water Systems. Layne's answer lies in the millions of gallons of clean, low-cost water that pour daily into once thirsty municipalities and industries. Find out why Layne Pumps and Well Water Systems are so much more economical and efficient . . . why Layne guarantees "Water Or No Pay" . . . *and how Layne's distinctive unit-ized organization serves in all phases of water supply.* Use the coupon or address LAYNE & BOWLER, Inc., Dept. B, General Offices, Memphis, Tenn.

WORLD'S LARGEST WATER DEVELOPERS

Layne & Bowler, Inc., General Offices, Dept. B, Memphis, Tennessee

Send me free bulletins on Layne Pumps, Wells, Well Water Systems of special value to municipal officials.

Name .....

Address .....

LAYNE PUMPS

AND WELL WATER SYSTEMS

At Last—Substantial Federal Aid for Public Works and Housing

UNDER the terms of the "National Industrial Recovery Act" (H.R. 5755), as adopted by the House of Representatives and now before the Senate, the President is authorized to create a Federal Emergency Administration of Public Works, all the powers of which are to be exercised by a Federal Emergency Administrator of Public Works. Among the provisions of the proposed Act of chief interest to municipal officials and civic organizations are:

"Sec. 202. The Administrator, under the direction of the President, shall prepare a comprehensive program of public works, which shall include among other things the following: (a) construction, repair, and improvement of public highways and parkways, public buildings, and any publicly owned instrumentalities and facilities; (b) conservation and development of natural resources, including control, utilization, and purification of waters, prevention of soil or coastal erosion, development of water power, transmission of electrical energy, and construction of river and harbor improvements and flood control; (c) any projects of the character heretofore constructed or carried on either directly by public authority or with public aid to serve the interests of the general public; (d) construction under public regulation or control of low-cost housing and slum-clearance projects; (e) any project (other than those included in the foregoing classes) of any character heretofore eligible for loans under subsection (a) of section 201 of the Emergency Relief and Construction Act of 1932, as amended." [Certain provisions as to naval construction, subject to treaty limitations, are also included.]

Loans and Gifts for Local Projects

Under section 203 of the proposed Act, "with a view to increasing quickly employment (while reasonably securing any loans made by the United States) the President is authorized and empowered, through the Administrator or through such other agencies as he may designate or create, (1) to construct, or aid in the construction or financing of any public-works project included in the program prepared pursuant to section 202; (2) upon such terms as the President shall prescribe, to make grants [gifts] to states, municipalities, or other public bodies for the construction, repair, or improvement of any such project, but no such grant shall be in excess of 30 per centum of the cost of the labor and materials employed upon such project; (3) to acquire by purchase, or by exercise of the power of eminent domain, any real or personal property in connection with the construction of any such project, and to sell any security acquired or any property so constructed or acquired or to lease any such property with or without the privilege of purchase: *provided*, that all moneys received from any such sales or lease or the repayment of any loan shall be used to retire obligations issued pursuant to section 207 of this Act, in addition to any other moneys required to be used for such purposes; and (4) to aid in the financing of such railroad maintenance and equipment as may be approved by the Interstate Commerce Commission as desirable for the improvement of transportation facilities: *provided*, that in deciding to extend any aid or grant hereunder to any state, county, or municipality the President may consider whether action is in process or in good faith assured therein reasonably designed to bring the ordinary current expenditures thereof within the prudently estimated revenues thereof. The provisions of this section and section 202 shall extend to public works in the several states, Hawaii, Alaska, the District of Columbia, Puerto Rico, and the Virgin Islands."

Highways, Streets and Traffic Facilitation

For the emergency construction of public highways and related projects, the President is authorized under section 204 to make grants to the several states (not to exceed $400,000,000 in aggregate amount, and with the stipulation that no part of the funds apportioned to any state need be matched by the state) as follows:

"(1) For expenditure in emergency construction on the Federal aid highway system and extensions thereof into and through municipalities. The amount apportioned to any state under this paragraph may be used to pay all or any part of the cost of highway construction including the elimination of hazards to highway traffic, such as the separation of grades at crossing, the reconstruction of existing railroad grade crossing structures, the relocation of highways to eliminate railroad crossings, the widening of narrow bridges and roadways, the building of footpaths, the replacement of unsafe bridges, the construction of routes to avoid congested areas, the construction of facilities to improve accessibility and the free flow of traffic, and the cost of any other construction that will provide safer traffic facilities or definitely eliminate hazards to pedestrian or vehicular traffic. In carrying out the improvements to eliminate traffic hazards in connection with railroad crossings at grade, the state highway department shall constitute an agency of the Federal Government. No funds made available by this title shall be used for the acquisition of any land, right-of-way, or easement in connection with any railroad grade elimination project.

"(2) For expenditure in emergency construction on secondary or feeder roads to be agreed upon by the state highway departments and the Secretary of Agriculture: *provided*, that the state or responsible political subdivision shall provide for the proper maintenance of said roads. Such grants shall be available for payment of the full cost of surveys, plans, improvement, and construction of secondary or feeder roads, on which projects shall be submitted by the state highway department and approved by the Secretary of Agriculture."

"Self-Liquidating" Restrictions Abolished

An appropriation is authorized under section 209 in the sum of $3,300,000,000 for the purposes of the Act; and section 301 stipulates that after the expiration of ten days after the date upon which the Administrator has qualified and taken office, no application shall be approved under the provisions of section 201 (a) of the Emergency Relief and Construction Act of 1932—the subsection under which loans by the Reconstruction Finance Corporation for self-liquidating projects were authorized.

Prompt Action Needed

Cities, counties and states with well-considered plans for needed public improvements, if they apply promptly under the new National Industrial Recovery Act, will be in line for much more liberal loans and gifts of Federal funds than ever before in American history. Indeed, it seems probable that certain amendments to be incorporated in the Act before adoption will make its terms more liberal than the text here quoted.

Radial-cone Bottom Elevated Tanks Offer Important Operating Advantages

MR. W. C. MABEE, Chief Engineer of the Indianapolis Water Company summarizes the reasons for using adequate elevated storage as follows—

1. *Elevated storage advantageously placed affords an economical solution of many distribution problems.*
2. *It utilizes pipe lines to the best advantage avoiding excessive friction losses which losses represent wasted energy that are reflected back to the coal pile.*
3. *It improves service by supplying quantity and pressure where most needed.*
4. *It improves fire protection.*
5. *Its effect on plants already equipped is to increase the safety factor by releasing equipment for reserve pumping capacity.*
6. *It postpones the installation of additional plant equipment devoted to the distribution of water.*

These six reasons for using elevated storage at Indianapolis are typical of most elevated tank installations. They are advantages which you can secure for your water works system, particularly if you provide the storage in modern shallow-depth tanks.

The radial-cone bottom design enables us to build tanks of a million gallons capacity and larger with a total range in head of only 25 feet. In the smaller sizes, the ellipsoidal-bottom design provides shallow depth.

Our nearest office will be glad to discuss the advantages of elevated storage with you and submit estimating figures.

CHICAGO BRIDGE & IRON WORKS

Chicago	2127 Old Colony Bldg.	Dallas	1206 Burt Bldg.
New York	3108 Hudson Terminal Bldg.	San Francisco	1033 Rialto Bldg.
Cleveland	2236 Midland Bldg.	Seattle	4343 Smith Tower
Detroit	1501 Lafayette Bldg.	Houston	2919 Main St.
Philadelphia	1616 "1700" Walnut Street Bldg.	Tulsa	1425 Philcade Bldg.
Boston	1501 Consolidated Gas Bldg.	Los Angeles	1403 Wm. Fox Bldg.
Birmingham	1502 N. Fiftieth Street	Havana, Cuba	Edificio Abreu 402

B-348

Fabricating plants in CHICAGO, BIRMINGHAM, and GREENVILLE, PA.

Do you mention THE AMERICAN CITY. Please do.

Pure Water—Man's Greatest Need

Items on Water Supply and Purification

Water Department Regulations

THE Department of Water Works of the city of Cincinnati, Ohio, has issued a new booklet containing the Ordinances, Rules and Regulations under which it operates as a public utility serving the people of the city. The booklet is unusually complete, and copies may be obained by application to the Department. Below is quoted the section on

SERVICE BRANCHES

Any property owner desiring the installation of a water service branch into his premises shall make application for same either in person or through an authorized agent. Every application shall be made in the name of the property owner, who thereby agrees to the rules and regulations pertaining to the use of city water. When plumbers, or parties other than owners, make such application, they act as agents for the property owners.

The installation cost of service branches shall be paid for at the time application is made. Meter application must also be made at the same time.

Only metered water service branches shall be permitted. Branches installed for fire protection shall be subject to special rules and regulations hereinafter set forth.

Service branches must be installed on the main directly in front of the property to be supplied with water.

That portion of the water service branch within the limits of streets, roads, avenues, alleys and other thoroughfares will be installed by the Department of Water Works. That portion from the property line to the meter shall be not less than ¾-inch inside diameter and shall be inspected by the water works inspector, said inspection to be made with service branch under normal water pressure previous to the time of backfill of the trench.

The Superintendent, with the approval of the City Manager, shall fix the prices to be paid for water service branches. These prices shall include the necessary excavation, insertion of corporation cocks, the furnishing and installing of pipe, curb cock, curb box and the street and sidewalk restoration, from the main to the property line of the street. These prices may be changed from time to time, depending upon the cost of material, labor, etc. The exact location of the water service branch must be given in the application. No refund will be made or other branch installed where an error has been made in giving the exact location. On the other hand, if the error in location is the fault of the water works, a new branch will be installed without additional cost.

Within the property and to the connection with the meter all water service branches shall comply with the following requirements:

All water service branches not exceeding 2 inches in diameter shall be of lead (extra strong), brass pipe (iron pipe sizes) or approved copper pipe.

All larger water service branches shall be of cast iron.

No wrought iron or steel pipe shall be used between the main pipe and the meter, owing to the probability of corrosion.

After the connection between the meter and the curb cock has been completed and tested, the water shall be turned off at the curb cock and shall not again be turned on until regular application for service has been made.

The approval of the Superintendent shall be obtained in all cases where a water service branch larger than 1 inch in diameter, or an additional branch, is applied for.

All water service branches shall be laid at a depth of not less than 3½ feet below the surface of the ground.

Service branches shall not be placed in the same trenches with sewer connections, except on the written permission of the Superintendent.

When any parcel of property is supplied through two or more interconnected water service branches, each branch shall be equipped with a check valve, so set that the water can flow into the premises but no water can flow out. Each branch shall also be equipped with a separate meter.

The service branches will be considered the property of the property owners, but the Department of Water Works will repair and maintain the service from the main to, but not including, the curb cock. However, after a service branch has been repaired three times, it shall be replaced by a new standard service branch at the property owner's expense.

The repair and maintenance of the curb cock, curb box and the service branch within the curb cock, shall be promptly done by the property owner. The curb box should be fitted with a tight lid and be, at all times, free from obstructions so that water can be readily turned on or off.

Failure to repair leaks within the curb cock, or failure to remove obstructions from curb box, will be sufficient cause for the Department of Water Works to shut off water service through said branch.

When water has been shut off for above cause, same will not be turned on again until the repairs have been made, and the payment of $2 for turnkey service, plus any additional expense to which the Department of Water Works may have been put to remove obstruction from curb box, or to repair curb box or curb cock. The above charge for turnkey service outside the corporate limits of Cincinnati shall be 50 per cent greater.

Notices of leaks and necessary repairs or replacements to be made will be left on the premises affected.

Failure to receive any such notice will not relieve the property owner of the responsibility of making repairs or the payment of the charges made by the Department of Water Works.

A 36-Inch Cast Iron Water-Supply Line

LINCOLN, NEBR., recently completed its new water-supply project which made available the water from the Platte River Valley near Ashland, Nebr. The main feature of this project is a 36-inch cast iron main pipe line, 25.1 miles long, which was constructed in 9½ months at a cost of $1,309,000. Another item was a cast iron well pipe line, 3.7 miles long, varying from 24 to 36 inches in diameter and costing $211,000. Other items such as land, wells, reservoir, pumping station, pumps and engineering cost brought the total cost of the project to $1,800,000.

Water is obtained from five wells located approximately one-half mile from the Platte River. The wells are 2,000 feet apart, and the nearest well is 2½ miles from the pumping station. Each well is equipped with a standard vertical 1,500-gpm deep-well turbine pump delivering water through the cast iron well pipe line into the reservoir at Ashland. The entire pipe line is covered with a minimum earth cover of 4 feet and a maximum cover of 16 feet. All creek crossings are by means of vertical inverted siphons with the top of the pipe 4 feet below the bed of the stream.

Automatic cluster air-relief valves were placed at all summits, and 8-inch blow-off valves were provided at all low points. In addition, access manholes were placed in the pipe line at 2,000-foot intervals, and concrete vaults were built around all air-relief valves and blow-off valves.

On one section of the main pipe line, approximately 200 feet long, the earth foundation was too unstable to support the pipe. At this location each pipe was supported on a bent of two 10-inch wood piles 20 feet long, with a 12 x 12-inch wood cap placed behind the bell. The entire top of the bent was then encased in concrete. Where the pipe line crossed railroad tracks a special construction was used, consisting of jacking a 72-inch No. 10 gage corrugated iron culvert underneath and across the track, through which the cast iron pipe was then laid. The space between the 36-inch cast iron pipe line and the 72-inch culvert was then filled with dry sand.

When the line was completed, the maximum leakage for any one section was 15.95 inch-gallons, and the average for the entire pipe line was 11.18 inch-gallons, both being only a fraction of the maximum permitted under the contract and specifications. The test pressures used in making the leakage test varied from 50 to 100 pounds per square inch.

Plans and specifications for the entire project and the supervision of all construction were handled by the City Engineer's office under the general direction of the Commissioner of Water. The main pipe line was built under contract by Abel & Dobson, and the well pipe line was built by Dobson & Humphreys, both local contractors. U. S. cast iron pipe was used throughout.

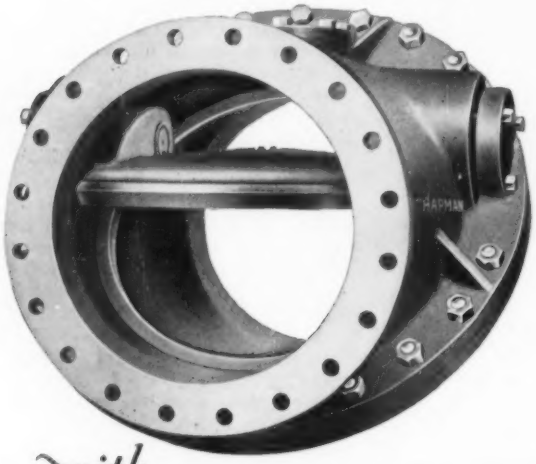
D. L. ERICKSON,
City Engineer, Lincoln, Nebr.

Lead Services in Milwaukee

MORE than 5,000,000 feet, nearly a thousand miles, is the amount of lead pipe underground in Milwaukee, Wis., supplying water to residents and industries. Frank J. Murphy, Superintendent, Division of Water Meters and Services, Milwaukee Department of Public Works, states: "Our first water service, which was installed in November, 1873, has been in constant service and, as far as our records show, has occasioned no trouble at all. Milwaukee has always used extra-strong, AA, lead pipe. Our experience of sixty years with lead pipe water services in ⅝-inch to 1¼-inch sizes has been highly satisfactory."

The average water pressure in Milwaukee is 52 pounds per square inch. There have been 133,407 lead water services laid in Milwaukee since the first one was installed in 1873. About 648,000 people, of whom 66,000 are outside the city, are supplied with water.

75% REDUCTION IN HEAD LOSS

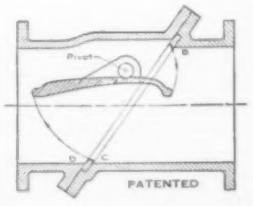


with Chapman NON-SLAM CHECK VALVES

THE BALANCED DISC of a Chapman Non-Slam Check Valve is supported by two bearings and requires very little force to hold it off its seat. As a result, head loss is approximately 75% less than that caused by the ordinary type of check valve.

There are no pockets or sudden enlargements to break the free flow or to hold sediment. The body of this valve is designed with clear lines throughout and the net area at all points is equivalent to the area of the pipe line.

A steadily increasing number of these valves are in use on water, oil, gas and air lines. Write for the illustrated booklet that fully describes the many advantages of the new Chapman Non-Slam Check Valves.



A cushioning effect, obtained by forcing the short flap of the disc against the stream, prevents slamming.

THE CHAPMAN VALVE MANUFACTURING CO.
INDIAN ORCHARD, MASSACHUSETTS

BALANCED DESIGN!

The "Plus" quality in American and Niagara Water Meters

Each part in a water meter must be well designed, finely built, if the meter is to give reasonable service. But an aggregation of fine parts is not enough to assure truly fine performance. It requires something "plus." *Balanced design* is essential!

Just as the well-rounded football team will outplay and defeat a collection of opposing stars who "play to the grandstands," so will perfect team-play of all parts in a water meter give the extra accuracy and added life that you are looking for. This you get in American or Niagara Meters.

Back of every American or Niagara Water Meter you buy today is 40 years' steady development of perfection in each part and in the balance of the whole. You can test for yourself the superior performance of American or Niagara Meters on your next meter order. Write for prices and details.

BUFFALO METER CO.
Established 1392
2902 Main Street Buffalo, N. Y.

NIAGARA (IRON CASE) and AMERICAN (BRONZE CASE) Water Meters

Meters Check Losses

Reports on the Services of Water Meters

Rock Island, Ill.

IN 1900 the population of Rock Island was 19,493. In 1910 the population had increased to 24,335 and the service then was 20 per cent metered. The average daily consumption per capita was 143.82 gallons. In 1920, with a population of 35,177, the consumption had dropped to 96.88 gallons per capita; and in 1930, with a population of 37,953, the daily consumption was 103.75 gallons per capita. There was much heavier industrial use of water in 1930 than in 1920, accounting for the increase. About 75 per cent of the services are metered. The actual saving in money due to meters is not known, but one thing is sure—a lot of water was saved by the installation of meters.—JOHN A. MURRIN, Superintendent, Water Works.

Atlantic, Iowa

THE population of Atlantic has increased from 5,000 in 1900 to 5,600 in 1932. The average daily consumption per capita has remained constant since then at 125 gallons, there being only 100 meters on 1,500 services. A water condition exists in Atlantic which makes metering difficult. It is desired, however, to meter, for the savings which can be effected through metering are well known and appreciated.—T. E. NICHOLS, Superintendent, Water Department.

Hammond, Ind.

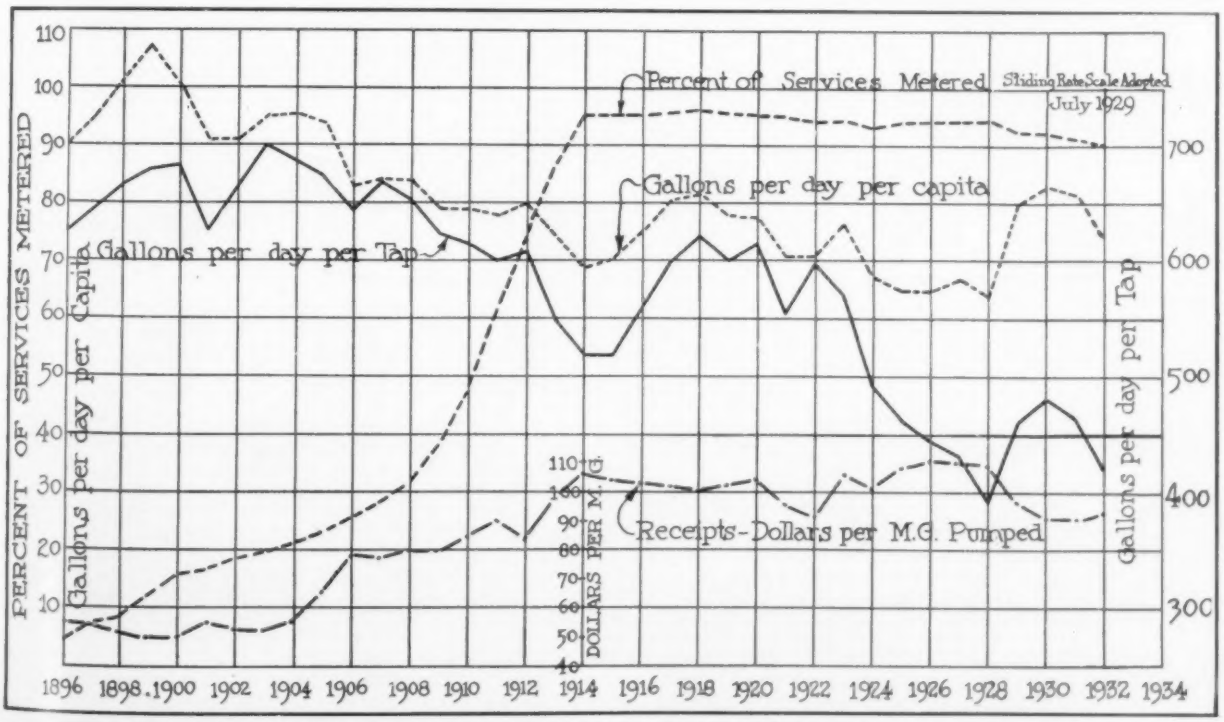
THE population of Hammond was 66,000 in 1932, when an intensive program of metering was instituted, so that now 95 per cent of the domestic services are metered and 100 per cent of the industrial services. The meters have not been in use long enough to determine just what savings have been effected through their installation.—F. MORROW, Engineer, Water Department.

Cherokee, Iowa

THE water system of Cherokee has been 100 per cent metered since 1900. In 1920, when the population was 5,794, the total daily consumption was 250,000 gallons. In 1930 when the population was 6,458, the daily pumpage had increased to 282,662, but this average was greatly influenced by the fact that the summer was exceedingly hot. In 1932 the average daily consumption was 261,312 gallons.—WM. SHARDLOW, Superintendent, Water Works.

Louisville, Ky.

IN 1910 the population of Louisville, Ky., was 223,900 and 9.5 per cent of all services were metered and the average daily consumption was 102 gallons per capita. In 1920 the population had increased to 234,000, the per cent of services metered to 13.3 and the average daily consumption per capita had increased to 140 gallons. In 1930 the population was 307,000, with a total of 330,000 consumers including those outside the corporate limits of the city. The services were 38.1 per cent metered and the per capita consumption had dropped to 124 gallons daily. The population in 1932 was 310,000, with 330,000 consumers, and 48 per cent of the services were metered. The average daily consumption was 117 gallons per capita. By extension of a graph of the average daily consumption by years, the pumpage in 1930 would have been 50 million gallons daily, if even a reduced program of metering had been carried out. The actual pumpage in 1930 was 41.15 million gallons daily, or a saving of 8.85 million gallons daily, equal to a yearly saving of 3,230 million gallons. The operating cost, exclusive of commercial and general expense, is $35.74 per million gallons, which reduced on the ratio of 41.15/50 equals $29.40 per million gallons, giving a saving of 3,230 x $29.40, or $94,969.35 in pumping costs alone for 1930.—JOHN CHAMBERS, Chief Engineer and Superintendent, Louisville Water Co.



THE EFFECT OF METERING WATER SERVICES IN NEW BEDFORD, MASS., FROM 1895 THROUGH 1932

SIMPLEX

Equipment for the Filter Plant

BUILT upon the foundation stones of simplicity, conservative design, fair price and dependable guarantee, the Simplex Valve and Meter Company, reviews the past twenty-five years of accomplishment in the water works field with pride and satisfaction and emerges from the present economic depression with confidence in the future.

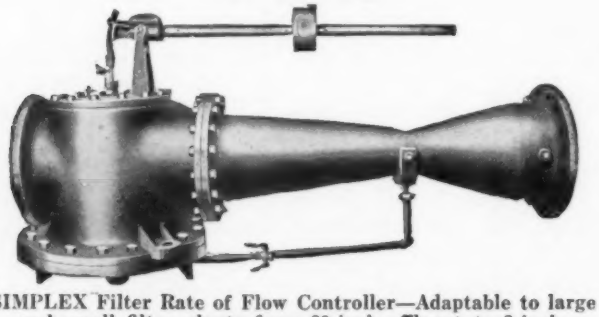
Among the larger filtration plants designed and built in 1932-33, in which varied applications of Simplex Controllers, Gauges and Meters have been installed, are—

The Mahoning Valley Sanitary District, Youngstown, Ohio
The new Sheahan Pumping Station and Filtration Plant Memphis, Tennessee
The Three Rivers Pumping Station and Filtration Plant Fort Wayne, Indiana
The Lehigh Water Company Filter Plant, Easton, Pa.
Extension to Filter Plant, Omaha, Nebraska
The Wilmette Filter Plant, Wilmette, Illinois.
Kirkwood, Missouri, Filter Plant
Ottumwa, Iowa, Filter Plant

You are cordially invited to see our exhibit at the 1933 Water Works Convention, Chicago, Ill.

SIMPLEX VENTURI TYPE METER
Indicates, Records and Totalizes the Rates of Flow, with any type of Venturi Tube, Orifice or Pitot Tube. Accurate over a wide range, with provision to check while in service.
Write for Bulletin 42

— Be Safe —



SIMPLEX Filter Rate of Flow Controller—Adaptable to large and small filter plants from 30-inch effluent to 3-inch.
Write for Bulletin 28-A and 50

SIMPLEX VALVE & METER CO.

Measuring and Controlling Equipment for Water, Sewage, Power and Industrial Plants

SIMPLEX TRADE MARK REG. U.S. PAT. OFF.

Water Flow and Water Waste Investigations Hydraulic Specialties

6743 Upland St., Phila., Pa.

Construction and Maintenance

Engineering and Highway Departments

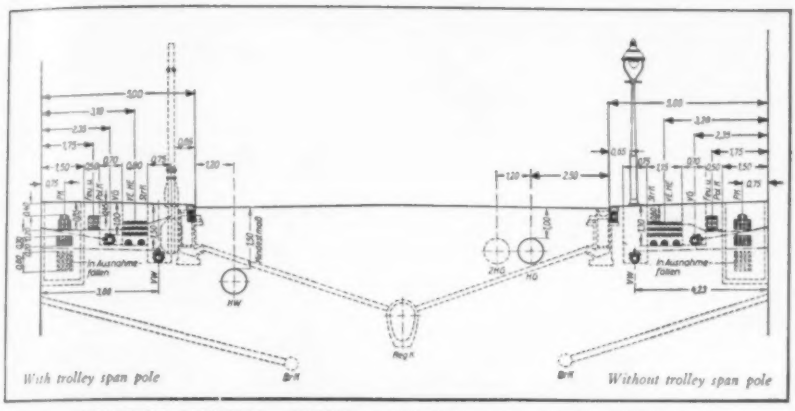


DIAGRAM SHOWING GERMAN STANDARD FOR ARRANGEMENT OF STREET INSTALLATIONS

Dimensions are Indicated in Meters

PK—Postal tubes
Feu. u. Pol. K.—Fire and police communication lines
VG—Gas distribution lines
VE.HE.—Electric lines
Str. K.—Electric lines for trolley lines and street lighting
VW—Water distribution lines
HW—Water mains
HG—Gas mains
Br.K.—Sewers
Reg.K.—Storm-water sewers

German Standards for Underground Installations

THE American Standards Association recently published data on the German standards for underground installations covering the arrangement of gas, water, electricity and other lines in streets. The first part of the standard deals with the planned arrangement of pipes and cables under streets. It provides that main lines shall in most cases be under the roadways, and the supply lines to buildings under the sidewalk. Distances are measured from the street line, and the exact locations and depths of various types of lines are specified.

The types to be placed under sidewalks are: postal tubes; cables for fire and police department use; gas pipes for house supply; electric lines for house supply and their supply cable; water pipes for house supply; cables to feed street-car lines and for street lighting, which are to be linked up with feed lines for house supply, with the car feed lines running along against the curbstones.

The types to be placed under the roadways are: main water pipes, sewers, etc. (not to be laid under car lines); long-distance gas pipes; street-car line installations (special regulations for these are contained in another document on traffic regulation). Tanks are permitted on private grounds only. The distance from the curb is specified for installations on streets such as street-car poles, street lamps, and hydrants. Planting of trees is usually permitted only where the sidewalk is over 6 meters wide, and they must be planted one meter from the curbstone.

The second part of the standard deals with the treatment of pipe lines and car tracks on streets. The principle is established that all lines, tracks, trees, etc., must be recognized as having equal rights in the street, and must enjoy like protection. If original plans of installations, or information regarding them, is not available, the authorities may make test cuts in the streets to see whether the space desired for work is free. No changes of position may be made without permission of the authorities.

To facilitate matters, it is recommended that every year in the month of December or January a conference of all interests be called by the authorities to discuss plans for the coming year for new construction and to lay out a program for the work.

The principle that no work on public property may be undertaken without permission having been obtained in advance stands except in cases of danger such as a broken pipe or cable. In such cases the authorities are to be informed by telephone, and permission is to be obtained as soon as possible.

Work is done by men in the employ of the special interest concerned, but the repaving of the street shall be done by the city authorities by agreement with those concerned. In cases of big undertakings, the city building authorities may supervise the work at the expense of the builder.

In the setting-up of building plans, tests may be made of the proposed arrangements for pipes, cables, sewers, etc., in cooperation with the authorities.

THE OLD AND THE NEW IN CULVERT CONSTRUCTION

This old rubblestone and timber culvert (left) is only a hundred yards from the new concrete culvert which carries the same stream on the relocation of a state highway just north of Elkton, Va., on the Luray-Elkton road

PITTSBURGH DES MOINES

Two 3,000,000-Gallon Steel Reservoirs
Berryville, Va.

150,000-Gal. Hemispherical Bottom Elevated Tank—Coraopolis, Pa.

Be Wise— Buy Now

Like a lot of us, you have probably been "sitting tight," on the assumption that the longer you wait the cheaper you'll buy. So far, we've all been right, but times have all the earmarks of a change, now. If we continue to sit tight, we'll find, after prices are well along on their upward march, that it has been pretty expensive sitting.

With present prices equalling those of 1913, and a ready market for securities, a more opportune time for making necessary or desirable improvements may not present itself for many years to come.

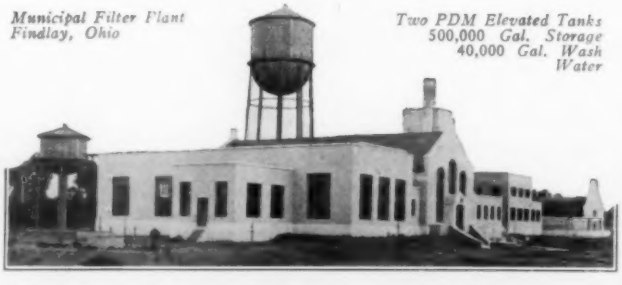
800,000-Gal. Hemi-ellipsoidal Bottom Elevated Tank—Zanesville, Ohio

Pittsburgh-Des Moines Products

Elevated Steel Tanks
Steel Reservoirs
Steel Standpipes
All Steel Filter Plants
Water Treating Plants
Steel Pipe and Penstocks
Steel Grandstands
Steel Smokestacks
Steel Plate Fabrication
Gasoline and Oil Tanks either Field Erected or Shop Assembled
Spherical and Cylindrical Gasholders
Tanks of Stainless Steel or Copper Alloys for Storage of Corrosive Liquids
Weldings
Radio Towers
Highway Bridges
Airplane Hangers

Municipal Filter Plant
Findlay, Ohio

Two PDM Elevated Tanks
500,000 Gal. Storage
40,000 Gal. Wash Water



Pittsburgh-Des Moines Steel Company

3412 Neville Island, Pittsburgh; 913 Tuttle St., Des Moines
Room 915—270 Broadway, New York

Chicago Dallas San Francisco Seattle

Catalogs and Information

Write for any of the following catalogs:

Modern Water Storage
Municipal Refuse Incineration
PDM Tanks for Service Stations and Bulk Storage Tanks
Pressure Holders for the Gas and Oil Industry
Welded Products (Weldings)
All Steel Grandstands
Industrial Buildings

If you have a definite project in mind we will, in addition to sending catalog, give you specific cost and design information, or have a representative call, with no obligation your part.

Treatment Conserves Health

SEWERAGE and SEWAGE DISPOSAL

Fighting the Psychoda

A STUDY of the habits of the psychoda alternata, the fly particularly common to sewage plants, reveals that they will be found most commonly associated with trickling filter plants. These flies pass through a cycle of life which in the summer months is completed in about two weeks. The psychoda are hatched from eggs and pass into the larval stage. From this they are transformed into the pupal stage and later mature as the adult filter fly. The eggs are laid and hatched in the film on the stones in the bed. The film is also the harbor and feeding place of the insects while in the larval and pupal stage. The adult flies do not remain on the stone and film, but are found everywhere around the plant. While they are most numerous in the immediate vicinity of the filter beds, they have been known to migrate a mile or more, when aided by a strong wind.

Control of psychoda alternata depends to a certain extent on the construction of the filter beds, the efficiency of the clarifier, the load placed on the beds, the maintenance of surrounding grounds, and geographical conditions. Reports of investigations indicate that the most complete destruction of filter flies has been accomplished by flooding the beds. The ability to do this of course depends upon whether the beds are constructed to hold a flooding volume of water for periods of, at least, twenty-four hours. There must also be available sufficient filter area to take care of the volume of sewage diverted from the flooded section. This method is effective for only a few days and must be repeated.

Chemical control has been tried in many different ways but, it must be admitted, with little success. Perhaps the most successful chemicals have been liquid cholorine and hypochlorite of lime. It has been contended by some that these chemicals have resulted in a small measure of success by sloughing off some of the gelatinous film and carrying the larvae with it. The effectiveness of the chemicals is limited to the attack upon the larvae, and they have no effect upon the adult fly other than retarding their multiplication for a short time. Unfortunately, owing to the danger of destroying the film and organisms in the bed which are essential for proper nitrification of the sewage effluent, it is at the present time impossible to apply any chemical or insecticide of sufficient toxic strength to destroy the adult psychoda on the beds. The adult fly can be attacked off the bed, however, and on surrounding structures, by spraying with different solutions.

Perhaps the most common spray used for this purpose is kerosene, alone or with orthodichlorbenzene, or different arsenate preparations. The writer's experience has been that while kerosene alone is not particularly destructive to the fly, it does not evaporate so rapidly, and as long as there is any remaining on the structures sprayed the flies endeavor to avoid it. Kerosene, even though it is not particularly toxic, can be recommended as a fairly good spray. Its inexpensiveness is a factor to be taken into consideration. Kerosene with from 25 to 50 per cent orthodichlorbenzene makes a deadly spray and its effectiveness will last for several days.

—From a paper presented by WILLIAM J. SIMPSON, Supervisor of Sewage Plants, Reading, Pa., before the Sixth Annual Conference of the Pennsylvania Sewage Works Association.

Building Sewer Siphons Without Cofferdams

THE city of Newark, Ohio, is located within the forks of three streams, which makes it necessary to carry the sewage under the stream bed by inverted siphons. To date, six siphons have been built, four using bell-and-spigot car iron pipe, and the two most recently constructed using Doublex Simplex pipe and a method which makes it possible to lay the pipe without cofferdam or pumping. These two siphons are known as the Franklin Avenue siphon, which consists of one line of 8-inch pipe and the Spring siphon, which consists of one line of 8-inch pipe and one line of 12-inch pipe laid parallel and at the same grade.

Approximately the same physical conditions were encountered in the installation of both siphons. The creek in each location was approximately 3 feet deep, and the pipe was laid with its invert 2 feet below the bed of the stream, or approximately 5 feet below the surface of the water. The excavating was done by a Keystone crawler shovel operated on the bed of the stream without the use of mats. The bed of the stream is of gravel which has good bearing power. The trench was excavated to a depth 2 feet greater than that needed for the depth of the pipe, and the excavated material was placed in piles on each side of the trench, so spaced as to permit placing wood poles across the trench at intervals of 16 feet, which was the length of the pipe used.

The pipe were then floated into position, one at a time on a raft, and suspended from the poles by means of a special rope hoist, using the level of the water as a guide. There was little difficulty in getting an accurate line on the pipe. After the pipe were all bolted together, with one man at each hoist, and each man provided with a graduated gage stick, the pipe was lowered to grade, a signal being given for each movement of the ratchet of the hoist.

After the pipe was lowered to grade, the excavated material, which was almost clean gravel, was filled in and around the pipe before the hoists were removed. It is felt that the pipe was installed just as satisfactorily as if a cofferdam had been constructed and the trench pumped dry before the pipe was laid.

C. H. WELLS,
Chief Engineer, Department of Public Service, Newark, Ohio.

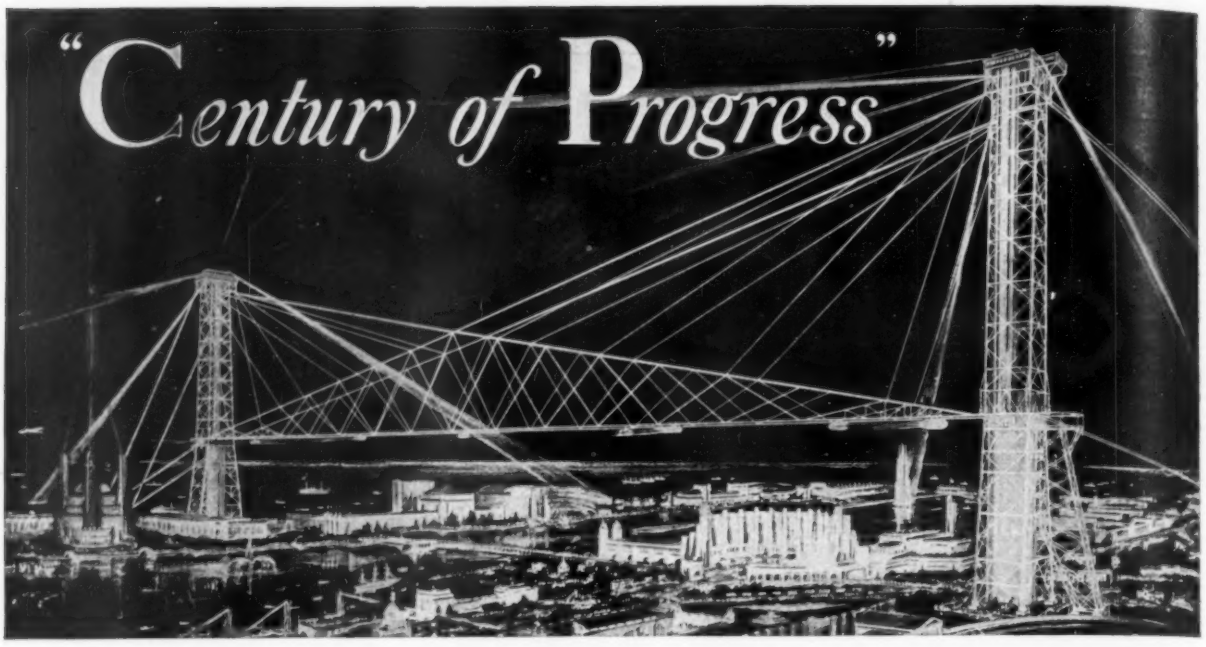
Building Sewage Works

SEWAGE treatment works built to last many years after their construction must provide capacity for some growth. A common practice has been to forecast the growth of a city in area and population and to provide capacity in sewers and other structures, not easily enlarged, for the area and population estimated to be reached forty to fifty years in the future. For structures easily extended, a common practice is to provide capacity for the conditions estimated to be reached ten to fifteen years in the future. It is found helpful also to consider how much money can be reasonably spent by the present population in providing for the growth of the community. As a guide, data have been assembled indicating this practice in a number of cities. Cities building sewage treatment works appear to have provided for a population of from 125 to 175 per cent of the population at the time of construction, and for intercepting sewers for a population of from 150 to over 300 per cent of the present.

Not only is it important to estimate the future population, but consideration must also be given to the area which this future population will occupy and to its distribution within this area. A forecast of the total future area and population of a city can be made with reasonable accuracy. The distribution of this population is a more difficult task. It has been found desirable to provide a factor of safety to be applied to the estimated future population as distributed throughout the forecasted future area. If, to a sub-area of 100 acres there have been allocated out of the estimated future population enough people to result in a density in this small area of 15 per acre, there might be a change in the direction of growth which would result in a density in this area of 30 per acre with a compensating lower population in some other part of the city. Such an occurrence would indicate a factor of safety of 2.

For larger areas, as for instance half of the entire city, the distribution of the future is not so likely to be in error, and a smaller factor of safety, say 10 to 15 per cent, might be applied.

From a paper presented by SAMUEL A. GREELEY, of Pearse, Greeley & Hansen, consulting engineers, Chicago, Ill., before the International Association of Public Works Officials.



chooses SAFETOP Fire Hydrants

Reg. U. S. Pat. Off.

—*exclusively*

The Kennedy SAFETOP Fire Hydrant is amply strong to withstand ordinary impacts, but if struck in a smashing collision, its patented Safety Breakable Section breaks cleanly apart, minimizing property damage and protecting the occupants of the colliding vehicle from likelihood of serious injury. Breakage of the hydrant will not cause flooding; and repairs can be made by one man, within half an hour, without excavating or shutting off the water supply, and at a total cost of less than $10.00.

THE exhibits and equipment of Chicago's 1933 World's Fair were all selected for the primary purpose of displaying the results of a century of progress.

The Exposition's 104 Kennedy SAFETOP Fire Hydrants were appropriately chosen for two important reasons: Firstly, because these hydrants represent the most modern development in fire hydrant design; and secondly because they assure the fullest measure of protection for the multitudes who will daily throng the Exposition grounds.

If you visit "A Century of Progress," you will find these hydrants at frequent intervals throughout the entire Exposition area. Notice their attractive appearance, their sturdy rugged construction, and their distinctive patented Safety Breakable Section located a few inches above the ground line. This is the hydrant which is being hailed by water department superintendents and fire chiefs all over the country as the complete solution to modern traffic and fire protection problems —*the hydrant which meets every requirement of strength, economy and effectiveness in fire fighting service and in collision emergencies.*

Besides the SAFETOP Fire Hydrants which are used exclusively throughout the Exposition grounds, "A Century of Progress" has also installed 442 Kennedy Valves of various types and sizes, and 252 Kennedy Extension Valve Boxes on water distribution and sewerage lines; and Kennedy Valves and Fire Hydrants are widely used on Chicago's water supply and fire protection systems.

The Kennedy Valve Mfg. Co., Elmira, N. Y.

KENNEDY

SAFETOP Fire Hydrant

Patented

When you write for that catalog, kindly mention THE AMERICAN CITY

METHODS and COSTS of REFUSE COLLECTION and DISPOSAL

Beaver Falls, Pa.

One motor truck, of 1½-yard to 2-yard capacity, is used by the city of Beaver Falls, population 17,147, for the collection of garbage within the corporate limits. The garbage is disposed of by incineration in a Lewis Kitchen type incinerator, erected in 1908.—IVAN P. LINDEMAN, City Engineer.

Conshohocken, Pa.

A single contract is awarded by the city of Conshohocken, population 10,815, for the collection of garbage. This contract is awarded for a 3-year period, the present contract calling for the payment of $300 per month. The contractor uses two 3-ton trucks for collection, and the garbage is disposed of by the collector, who feeds it to hogs.—JOSEPH QUINN, Secretary.

Donora, Pa.

Municipal collection is used on Donora, population 13,905, for the removal of garbage. The city uses one 2½-ton truck for this purpose and disposes of the garbage in the municipal incinerator.—L. G. SPHAR, Borough Engineer.

Monessen, Pa.

The city of Monessen, population 20,268, uses four 2-ton trucks for the collection of garbage within the corporate limits. The garbage is disposed of by incineration.—JOHN C. LERMANN, City Clerk.

Munhall, Pa.

The borough of Munhall, population 12,995, collects the garbage with two 2-ton wagons and two 4-ton motor trucks. Disposal is by means of a Pittsburgh-Des Moines incinerator.—L. Y. WOODWARD, Borough Clerk.

Vandergrift, Pa.

The city of Vandergrift, population 11,479, collects the garbage throughout the city with two 1½-ton motor trucks of 3-cubic-yard capacity. The garbage is disposed of in the municipal 40-ton Pittsburgh-Des Moines incinerator.—HEALTH DEPARTMENT.

Cranston, R. I.

A single contractor, paid by the city, collects the garbage in Cranston, population 42,911, using three wagons with 7 x 4 x 3½-foot bodies and ten 1- and 1½-ton motor trucks with similar sized bodies. The garbage is disposed of by feeding to a herd of 800 to 900 pigs.—DANIEL S. LATHAM, M. D., Superintendent of Health.

East Providence, R. I.

The town of East Providence, population 29,995, awards a contract annually to one individual for the collection of garbage. The present contractor uses two wagons and two motor trucks for this purpose. The garbage is disposed of by feeding to pigs.—WILLIAM E. SMYTH, Town Clerk.

Newport, R. I.

Garbage collection is handled by contract in Newport, population 27,612, the contractor using five trucks of 2½-ton capacity each, in addition to one emergency or pick-up truck. The garbage is disposed of by towing to sea in scows.—EDWARD MURPHY, M. D., Commissioner of Health.

Kingsport, Tenn.

The city of Kingsport, population 11,914, collects garbage within the corporate limits using two 1-ton motor trucks with 2-yard bodies. The garbage is disposed of by incineration.—F. L. CLOUD, City Manager.

Galveston, Texas

Ten wagons, twelve 1½-ton motor trucks, three large brush trailers 24 feet long, and four Fordson tractors, are used by the city of Galveston, population 52,938, for the collection of garbage, which is disposed of entirely by incineration.—WALTER KLEBERG, M. D., City Health Officer.

Houston, Texas

The operating expenses of the city of Houston, population 292,352, for all departments were reduced $1,500,000 in 1932 below the operating expenses of 1931. There was allocated to the Garbage Department the sum of $146,000. With this sum, which required considerable retrenchment, the Department is now operating sixteen 1¼-ton wagons and twenty-six 1½-ton trucks for collection. For the sum allotted to the Garbage Department, the garbage is being collected and disposed of at a cost of less than 50 cents per capita, which is believed to be the lowest per capita rate in the United States.—ED. J. RYAN, Superintendent, Garbage Department.

Jacksonville, Texas

The city of Jacksonville, population 6,748, uses one 8-cubic-yard wagon for the collection of trash, which is shipped by freight out of the city. Garbage is collected by private individuals and fed to hogs.—J. BRYAN MILLER, City Manager.

Lufkin, Texas

The city of Lufkin, population 7,311 collects cans and bottles by wagons and garbage with a 1½-ton dump truck with 12-inch sideboards, which is used four days a week for this purpose and two days on street work. In the business district trash is collected in a 1½-ton Dodge truck with a wood frame giving it 5 cubic yards capacity. All combustibles are burned in the municipal incinerator, the remainder being used in fills.—T. L. DUNN, City Manager.

Mercedes, Texas

In Mercedes, population 6,608, the city uses two motor trucks, one 2½-ton and one 1-ton, for the collection of garbage, which is disposed of in the municipal incinerator.—W. M. MCCLELLAN, Superintendent of Streets and Sanitation.

Salt Lake City, Utah

Municipal collection of garbage in Salt Lake City, population 140,267, requires the use of thirty-two wagons and six motor trucks with 4-yard bodies. The wagons are used in trains. The wet garbage is sold to a pig farm, and refuse and ashes are disposed of on the public dump.—LEE LINN, Sanitary Department.

Alexandria, Va.

Three motor trucks with 4-yard bodies are used by the city of Alexandria, population 24,149, for the collection of garbage. There are a few private collectors in the city who secure the garbage for use on hog farms. The city disposes of the garbage by dumping with the rubbish.—DR. JAMES J. GARVEY, Director, Sanitary Department.

Danville, Va.

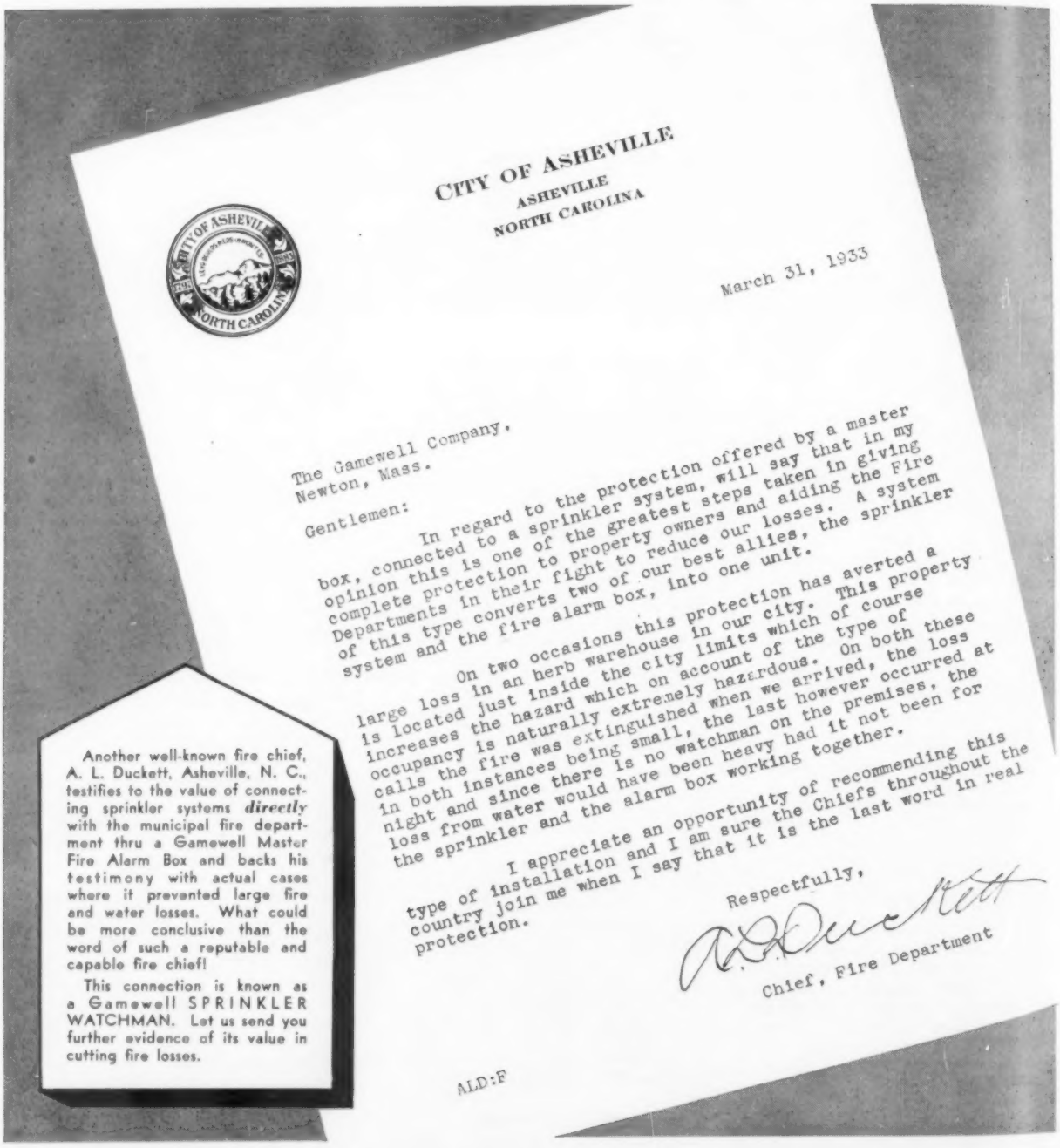
The city of Danville, population 22,247, uses five 1½- to 2½-ton motor trucks with 7 x 13-foot bodies, and one trailer with a similar sized body, for the collection of garbage. All garbage and refuse is disposed of in the municipal incinerator.—C. L. SCOTT, JR., Director of Public Works.

Lynchburg, Va.

The city of Lynchburg, population 40,661, uses three special 1¼-ton motor trucks with 5-cubic-yard dump bodies for the collection of garbage and refuse, all of which is disposed of in the municipal incinerator.—J. ELMORE MCCARRON, Director, Department of Public Service.

MORE EVIDENCE!

that Fire Losses Are Reduced by CONNECTING SPRINKLER SYSTEMS to MASTER FIRE ALARM BOXES.



CITY OF ASHEVILLE
ASHEVILLE
NORTH CAROLINA

March 31, 1933

The Gamewell Company,
Newton, Mass.

Gentlemen:

In regard to the protection offered by a master box, connected to a sprinkler system, will say that in my opinion this is one of the greatest steps taken in giving complete protection to property owners and aiding the Fire Departments in their fight to reduce our losses. A system of this type converts two of our best allies, the sprinkler system and the fire alarm box, into one unit.

On two occasions this protection has averted a large loss in an herb warehouse in our city. This property is located just inside the city limits which of course increases the hazard which on account of the type of occupancy is naturally extremely hazardous. On both these calls the fire was extinguished when we arrived, the loss in both instances being small, the last however occurred at night and since there is no watchman on the premises, the loss from water would have been heavy had it not been for the sprinkler and the alarm box working together.

I appreciate an opportunity of recommending this type of installation and I am sure the Chiefs throughout the country join me when I say that it is the last word in real protection.

Respectfully,

A. L. Duckett

Chief, Fire Department

ALD:F

Another well-known fire chief, A. L. Duckett, Asheville, N. C., testifies to the value of connecting sprinkler systems *directly* with the municipal fire department thru a Gamewell Master Fire Alarm Box and backs his testimony with actual cases where it prevented large fire and water losses. What could be more conclusive than the word of such a reputable and capable fire chief!

This connection is known as a Gamewell SPRINKLER WATCHMAN. Let us send you further evidence of its value in cutting fire losses.

THE GAMEWELL COMPANY
NEWTON, MASSACHUSETTS

Fire—Police—Safety Items

of Interest to Departments of Public Safety

Lowering Fire Losses

REPORTING on the Fire Department of Kansas City, Mo., the Civic Research Institute of that city, in the May 4, 1933, issue of *Kansas City Public Affairs*, states that the present year has begun with the lowest losses for the three-months period in many years, and that the savings to the city have been very large:

"The savings in losses for the past six years over the preceding six are more than sufficient to pay the entire cost of operating the Department for those years. The saving in losses 1927-1932, inclusive, over 1921-1926, inclusive, is $6,811,000. The cost of operating the Department 1927-1932 was $5,329,000. Good fire service pays."

Continuing, the bulletin gives reasons why these savings have been possible and shows further improvements needed—suggestions that may have application to many other cities:

"One important factor in the loss reduction in recent years has been the provision of modern, adequate fire-fighting equipment. Another has been the better training of firemen. Still another has been centralized control and responsibility.

"Two major improvements in operation remain to be adopted. These are probably necessary before losses can be reduced to a point comparable with the best cities.

"First, the introduction of and rigid adherence to the merit system in the selection, promotion, retention, etc., of firemen and other employees.

"Second, an adequate fire prevention division with a trained personnel.

"A third might be added—a sound pension plan, fair both to employees and to the city and in no danger of collapse."

Guarding and Guiding Visitors to the World's Fair, 1933

THREE hundred scarlet-coated policemen in white pith East Indian sun helmets and carrying white bamboo swagger-sticks will guard the crowds at A Century of Progress—the Chicago's World's Fair of 1933. Black trousers with yellow stripes and black Sam Brown belts complete the uniform.

The Fair police are recruited from the trained men on the eligible list of the Chicago South Park police, which is an Illinois state department, since Chicago's lake front parks and boulevards are under state jurisdiction. Chicago city police headquarters, however, are close to the Fair grounds and the Fair force will work in cooperation with the city department. Full police authority on the grounds is delegated to the Fair department.

Two thousand guides in the Fair uniform, gray military tunic and trousers with red stripes and arm insignia, black Sam Brown belts and flat-topped military visored caps, will be on duty. Four hundred of the guides have been on pre-opening duty, and 1,600 have been trained and are awaiting call. They are all college graduates, all tall young men, and have survived a drastic physical examination and mental test. The duties of the guides include information service, visitors and traffic direction. They have not been given any police authority.

Night watchmen in all the Fair buildings will be Pinkerton Agency police in the familiar blue uniforms. In addition to the uniformed force a large number of plain clothes detectives drawn from the most skillful and experienced man hunters all over the country will be among the crowds to keep watch for crooks.

Traffic Signals on Ohio Roads

FIELD men have been put to work to make a survey of traffic signals on rural Ohio state highways, including those routes passing through municipalities of less than 5,000 population, to enable the State Highway Department to study measures looking toward greater safety for motorists and pedestrians alike. Cities above 5,000 are excluded.

A total of 427 electric traffic signals are now in operation on state highways in Ohio. Ninety per cent of these signals operated outside of cities on state roads are located in small municipalities. Safety and rights of the pedestrian will be safeguarded through the cooperative plan to be worked out with local officials where signal changes are concerned.

O. W. MERRELL,
Director, Ohio Highway Department.

He Had No Other Playground, So—

A POSTER USED BY THE BETTER TRAFFIC COMMITTEE, PITTSBURGH, PA.

Municipalities, *Awaken!*

THERE is scarcely a municipality today, whether large or small, whose public officials have not been criticized severely for their tardiness in reducing budgets to meet the crisis brought on by the depression.

These officials have been so harassed by the financial authorities that they have in many instances eliminated needed improvements which had been carefully planned in the extensions of their street, sewer, water and other departments.

They have done much towards the elimination of waste. They have combined departments to cut down overhead. But their most important duty *now* is to bring forth their perfected plans for needed work and thereby be the means of putting thousands of unemployed *speedily* and *efficiently* to work.

SMITH

WATER WORKS SPECIALTIES & SUPPLIES

THE A.P.SMITH MFG. CO. *East Orange, N.J.*

Mention THE AMERICAN CITY—it helps.

JUNE, 1933

Vol. XLVIII, No. 6

The American City

470 Fourth Avenue
New York

35 Cents, $2 a Year

Developments and Improvements in a Borough Water Supply

Ridgewood, N. J., Operates a Well-Water System and Supplies Three Adjacent Boroughs

THE GROUNDS AT THE GODWIN AVENUE OR WORTENDYKE PUMP STATION, RIDGEWOOD, N. J.

By J. A. CARR
Superintendent,
Water Department,
Ridgewood, N. J.

RIDGEWOOD and the territory which it serves with water are situated in the northern end of Bergen County, N. J., about six miles north of the silk town of Paterson and about twenty miles from New York City. It is a community of homes, the major portion being detached, single-family dwellings on large lots with well-kept lawns, shrubbery and gardens. There is practically no industrial use of water, but, owing to the character of the grounds surrounding the dwellings, there is a very large use of water during the summer months.

The Water Department of the village of Ridgewood was acquired by purchase on June 1, 1921, from the Bergen Aqueduct Co., a private corporation. At the time of purchase that company was supplying not only Ridgewood, but also the adjoining boroughs of Glen Rock and Midland Park. Because the systems were interconnected and their operation interdependent, it was necessary for Ridgewood to buy the entire system; so that now the village of Ridgewood is in the unusual position of owning and operating the system, not only within its own limits, but also in two adjoining boroughs. The customers in all three municipalities are served subject to the same rates, rules and regulations. Water is also supplied to the borough of Hohokus through a master meter. Hohokus owns its own distribution system.

The Department is entirely self-supporting. At no time since its purchase by the village has it been necessary to appropriate money from the general taxes for the support of the Department; nor have funds from the Department earnings been diverted for other village uses.

The supply is all obtained from wells averaging 250 feet in depth, drilled into the red sandstone underlying this section of New Jersey. In no case is the rock more than 25 feet below the surface. The walls are all cased and sealed into the rock, and have capacities varying from 125 to 500 gallons per minute. The water obtained is of good quality, and medium hardness, tasteless, odorless and colorless.

Improvements in Pumping Stations

At the time of purchase there were two pumping stations, one in Ridgewood and one in Midland Park. At each of these stations there were two steam-driven pumping units taking water by direct suction from eight wells, each 8 inches in diameter. The water was pumped directly into the distribution system and storage tanks, the total storage capacity being 1,357,000 gallons.

During 1925 and 1926 the Midland Park pumping station was rebuilt and the use of steam suction pumps discontinued. Five new wells were drilled, each 12 inches in diameter and 285 feet deep. On these were installed A. D. Cook motor-driven deep-well turbine pumps, pumping at a low head into a receiving tank, from which the water is put into the system by American Well Works motor-driven centrifugal pumps. The installation is automatic in operation, floats on the storage tanks controlling the centrifugal pumps, and floats on the receiving tank controlling the turbine pumps. All pumps at this station are connected to transfer-switches so that the starting order can be changed.

At this station there are four centrifugal pumps, two operating on a so-called high service supplying all of Midland Park and the higher sections of Ridgewood, and two on low service supplying the remainder of Ridgewood, Glen Rock and Hohokus.

When the turbine pumps were installed, units too large for the capacity of the wells were used, resulting in low efficiencies and high power costs. During 1932 the turbines were replaced with others more closely adapted to capacities and pumping levels. The immediate result of the change was a saving in power costs at that station of $4.25 per million gallons.

An additional steel storage tank of 634,500 gallons capacity was erected in 1926. To remedy a low-pressure condition in the eastern section of Ridgewood during periods of maximum draft, due to inadequate feeder mains in that area, two wells were drilled in 1925 and equipped with motor-driven turbine pumps delivering directly into the distribution system. They are unattended and are automatically controlled by the pressure in the system.

During 1929 the steam equipment at the Ridgewood station was abandoned and replaced with motor-driven centrifugal pumps using the same suction system. In 1931 still another 12-inch well and a turbine pump were installed on the east side of Ridgewood. This unit is remote-controlled by the operator of the other Ridgewood station.

All turbine pumps, with the exception of the one in Graydon Park, are housed in concrete buildings, 14 feet square, with the usual hatch for pulling the pump. Because of the prominent location of the Graydon Park pump house, it was felt that something more artistic should be constructed. A building was therefore designed to be built of split rubble with clinker brick trim. The inside wall is of common brick, and the outside of large rubble stone split and laid with the split face outward. The variety of tints and colors secured in the stone was surprising, and the house presents a most attractive appearance. It was erected at a cost but little more than if it had been built of plain concrete. The small pump houses are heated, when necessary, with the smallest size Humphrey unit gas heaters, controlled by thermostats. This method of heating has proved most satisfactory and quite economical.

Ridgewood has recently purchased additional land to westward in the township of Wyckoff, where it is expected an additional 1,000,000 gallons of water per day will be developed.

The grounds about all the stations are seeded, planted with shrubbery and maintained in a neat and orderly manner. At the Godwin Avenue station there is an attractive lily pond, plentifully stocked with goldfish. A portion of the Water Department lands is used by the Village Shade Tree Commission as a nursery.

Level Recording Equipment for Elevated Tank

One of the older storage tanks, the Valley View Avenue tank, is located in what has developed into a very high class residential area. It is about two miles from the Godwin Avenue pumping station. To know at what level the water stood in the tank, it was necessary for an employee to visit it two to four times a day and telephone the information to the pumping station. With this meager information and in an effort to keep the tank full, it was frequently caused to overflow—a condition which has been a constant source of inconvenience and annoyance, not only to the Department, but more especially to the neighbors in the immediate vicinity of the tank. It is so situated that it was impossible to provide adequate drainage facilities for the overflow.

In the last several years a number of water-level indicators have been investigated and considered not suitable for the conditions, or too expensive to maintain. Recently, after due consideration of the instrument, it was decided

THE VALLEY VIEW AVENUE TANK, SHOWING THE CHARACTER OF THE DISTRICT AND, AT RIGHT, THE ELECTRIC METER BOX AND MANHOLE FOR THE CHRONOFLO TRANSMITTER

to install one of the newly developed Chronoflo water-level recorders. The transmitter is located in a concrete pit near the tank, with a ¾-inch water connection to the outlet at the base of the tank. Wires for current and telephone wires are brought to the pit through underground conduits from the poles in the street. One pair of wires is leased from the telephone company, leading from the transmitter at the tank to a recorder at the Godwin Avenue pumping station two miles away. The elevation of the water in the tank is recorded with a great degree of accuracy on a 10-inch chart. It is expected that, the operator being aware at all times of the elevation of the water in the storage tank, and the danger of overflowing eliminated, enough additional pumping can be done on night power rates to more than save in power charges the yearly cost of the telephone line and to pay for the instrument. The night power rate is $0.004 per kilowatt-hour less than the day rate, so that for every million gallons pumped during the night there is a saving of $4.80 per million gallons.

Metering and Fire Protection

When the plant was acquired, customers were being supplied on a flat-rate basis. The village started metering in 1923. The system is now 100 per cent metered, and the total amount of water billed to the consumers in 1932 was 81.2 per cent of the total pumpage.

To furnish water and afford ample fire protection for its 21,000 people, the Department maintains 95 miles of mains, 922 valves and 526 fire hydrants. The output of all pumping stations is measured through venturi meters, and complete records are kept of all costs, power consumption, rainfall, ground-water levels and other essential data.

The rates for meter service in Ridgewood include a fixed or service charge which is made to each customer for each meter, based on the size of meter or connection regardless of the amount of water consumed, as follows:

Size of Meter	Charge per Quarter
⅝-inch	$1.50
¾-inch	2.00
1-inch	2.50
1¼-inch	3.00
1½-inch	3.50
2-inch	4.00

In addition to the service charge, all water supplied through meters is charged to each customer as follows:

For the first 100,000 gallons of water per quarter, or any part thereof, 30 cents per 1,000 gallons
For water in excess of 100,000 gallons and under 200,000 gallons per quarter, 25 cents per 1,000 gallons
For water in excess of 200,000 gallons and under 300,000 gallons per quarter, 20 cents per 1,000 gallons
For water in excess of 300,000 gallons per quarter, 15 cents per 1,000 gallons

Inasmuch as Ridgewood furnishes water to other communities, which use it for public service and fire protection, an interesting method of charging has been developed. Each municipality served pays for each year an inch-foot charge of 67/100 of a cent ($0.0067) per inch diameter per foot length of distribution and transmission mains serving that municipality. This is computed by separating the piping systems into distribution and transmission mains and determining the aggregate number of inch-feet in the distribution and transmission mains, including no mains less than 6 inches in diameter. All the distribution mains located entirely within the boundaries of each municipality and serving only that municipality

A GAGE BOARD AT THE WORTENDYKE PUMP STATION

At top, the Chronoflow water-level recorder; below at left, the pressure gage on the high service; and at the right the gage on the low service

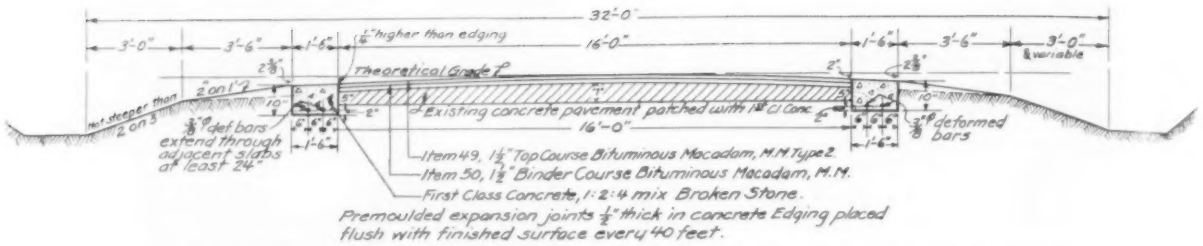
are chargeable to that particular municipality at the inch-foot rate. All mains 8 inches and larger supplying more than one municipality are deemed transmission mains and are charged at the inch-foot rate apportioned to the several municipalities to which they supply water, in proportion to the population of those municipalities as listed in the latest Federal Census. The aggregate annual charge for each municipality is found by taking the sum of the inch-foot charge for the distribution mains within the municipality and the proportion of the inch-foot charge for the transmission mains applicable to that municipality.

Each municipality pays a hydrant charge to Ridgewood at the rate of $6.00 per year for each public hydrant and pro rata for fractions of a year.

There are about 6,500 meters on services in the Ridgewood system, including those in other cities served by Ridgewood, and practically all are Trident meters. The meter repair shop, located on the second floor of the building next to the Water Department office, is equipped with testing equipment furnished by the Neptune Meter Co. The first floor is used as a stock room for water department supplies and for storing small service cars. All meters removed for any cause are tested when they are brought into the shop, and if repairs and adjustments are necessary, they are made and the meters are again tested. Each meter is marked with a permanent tag showing the date of the last test. The Department is continually running tests on meters, removing them from service according to their age and number of gallons recorded. Complete records are kept of all settings and removals and tests.

Construction Standards

THE "American Standards Year Book" for 1932-1933 has been recently issued by the American Standards Association (29 W. 39th St., New York). It represents the work of more than 500 national technical and trade organizations in the development of a unified system of basic technical standards for industry. During the last year 31 new national standards have been established. 44 pp. (Apply to the Association.)


32'-0"
3'-0"
3'-6"
1'-6"
(½" higher than edging
16'-0"
1'-6"
3'-6"
3'-0"
Variable
Theoretical Grade
2 on 1½
not steeper than 2 on 3
Existing concrete pavement patched with 1:2:4 Conc
16'-0"
⅝"ø def bars extend through adjacent slabs at least 24"
⅝"ø deformed bars
Item 49, 1½" Top Course Bituminous Macadam, M.M Type 2
Item 50, 1½" Binder Course Bituminous Macadam, M.M.
First Class Concrete, 1:2:4 mix Broken Stone.
Premoulded expansion joints ½" thick in concrete Edging placed flush with finished surface every 40 feet.

CROSS-SECTION AND SPECIFICATIONS OF THE FARNHAM-IRVING ROAD, NEW YORK STATE

A Typical Hot-Mix Resurfacing Job

By **ELMER C. LAWTON**
Deputy Highway Commissioner,
State of New York

AS an example of the use of hot-mix for resurfacing concrete pavement, a typical highway from among the first jobs of this character resurfaced by the New York State Department of Public Works has been chosen. This road is on a heavily traveled route from Buffalo to the Pennsylvania state line and carries about 6,000 vehicles in 12 hours. The section under discussion is 2.11 miles long and with adjoining sections forms a continuous stretch extending northerly from the south Erie County line. The old pavement was 16 feet in width and the soil conditions were very difficult and unsatisfactory. The soil was a stiff clay which holds surface water and provides an unstable base. At the time of reconstruction, the pavement was quite rough, somewhat broken up, with considerable evidence of scale and some disintegration. The original concrete pavement was constructed in 1916 of a 1:1½:3 mix, 5-7-5-inches in thickness, 16 feet wide, with a parabolic crown and with treated wood expansion joints 33 feet apart. The subgrade was flat and without a longitudinal center joint.

The highway was reconstructed in 1923 by the addition of a 3-inch modified Topeka top course, New York specifications M.M., Type 2, consisting of a 1½-inch leveling course and a 1½-inch top course over the existing pavement. At the time of reconstruction the old pavement was badly scaled and badly cracked, but with little displacement of broken concrete. It had a dead sound when struck with a hammer. Also, it had been extensively patched.

The typical section shows the design of the completed pavement, the cross-hatched portion showing the original pavement. The shoulder is only 3 feet 6 inches wide from the outside of the edging, but this was done in order to keep the earth work to a minimum. A concrete edging 1 foot 6 inches wide and 10 inches deep with metal reinforcement near the bottom was constructed on each side of the old pavement. These edgings increased the traveled way from 16 feet to 19 feet, and served as a form for placing and finishing the pavement. Also, owing to the color contrast, they made excellent pavement markers on the outside edge of the pavement.

The resurfacing contract was 2.11 miles long and required four months to complete. It embraced 20,400 square yards of macadam top, and it was necessary to replace approximately 570 square yards of the old concrete. All broken concrete of less than 4 square feet was removed, the holes were squared up and replaced with new concrete, and the poorest concrete was also removed and replaced. The replacement of concrete was 2½ per cent of the total area of the old pavement, and not all the poor concrete was removed, by any means.

The asphalt in the top course averaged 8½ per cent. Analysis of the mineral aggregate in the top course is as follows:

7	per cent	passed	200	screen
17	per cent	passed	80	screen
26	per cent	passed	40	screen
30	per cent	passed	10	screen
40	per cent	passed	4	screen
10	per cent	passed	2	screen

The average weight of the top course per square yard was 147 pounds, and it was 1½ inches thick.

The analysis of the bottom course is as follows: 4½ per cent asphalt, 10 per cent sand, and the remainder stone of approximately ¾-inch size. The bottom course weighed 149 pounds per square yard, which includes some leveling.

The cost of the entire project, including the added 3 feet of concrete edging, was $55,000, or an average of about $28,000 per mile. The cost of macadam only was $1.54 per square yard.

There are four principal objections to this typical section:

1. The edging, flush with the finished pavement, holds water along the edge of the pavement and all low points in grade. Later, holes were cut through this edging with a pneumatic chisel to serve as weeps, so that the water could be drained away from the asphalt.

2. It was later necessary to add a third lane of concrete pavement, and there are now too many longitudinal joints showing through the top of the pavement, which require constant maintenance to prevent water from seeping into the joints.

3. The top of both edgings scaled badly and it was necessary to surface-treat it, thus destroying the white strip for guiding traffic.

4. Heavy traffic slowly displaced the edging in places, since the line of wheel travel was near the construction joint. This action was foreseen, but it was thought that the 18-inch edging had enough stability to keep it in place.

Cautions in Details of Construction

There are also several precautions which should be taken in this type of construction:

1. All old bituminous mat should be removed and the old pavement should be thoroughly cleaned. This feature was covered by the insertion of an item in the contract identified as "Cleaning Old Pavement" and paid for by the square yard.

2. While the transverse joints on this old pavement were of treated wood, later pavements used bituminous material such as premolded joints. At least 1 inch of the top of the old premolded joints should be removed prior to placing the binder course, otherwise the expansion of the concrete forces the bituminous material to the top and creates humps in the finished asphalt pavement.

3. While the typical section shows a vertical inside face of the edging, actually a little of the subgrade under the edge of the old pavement was removed and the concrete was permitted to flow under the edge of the old pavement, thereby giving it some added support.

The pavement today is in fair shape. There are some depressions in the old concrete base, but the concrete has not been displaced and it has been leveled up with M. M. Type 3. In the construction of the top course some stone dust was used in the mix in order to reduce the amount of expensive bagged mineral filler. This was a mistake, for it prevented rigid control of the mix and has resulted in a few fat and a few dry spots in the surface of the pavement. On all similar work since that time, the substitution of stone dust for the regular mineral filler has not been permitted.

Maintenance

The following tabulation of maintenance costs on the pavement includes figures since the original construction in 1916 up to and including the year 1931, together with a traffic census consisting of a 12-hour count from 1922 to 1931. Maintenance charges in 1930 and 1931 include maintenance on an 11-foot strip of concrete, 1.3 miles long, which was built in 1928 in order to widen the pavement to 30 feet. The drop in traffic census from 6,546 in 1930 to 3,099 in 1931 is due to the completion of a parallel route into Buffalo which somewhat relieved traffic congestion on this highway.

MAINTENANCE COST ON PAVEMENT ONLY			Traffic Census 12-Hr. Day Count
1918	$225 30 for 2.11 miles =	$107 00 per mile	
1919	26 50	13 00 " "	
1920	227 87	108 00 " "	
1921	458 23	217 00 " "	
1922	1,818 06	860 00 " "	1,881
1923	being reconstructed (2.11 mi.)		2,667
1924	41 00	19 00 " "	3,529
1925	40 00	19 00 " "	4,625
1926	160 85	76 00 " "	3,576
1927	1,453 06	688 00 " "	4,693
1928	305 17	144 00 " "	4,806
1929	252 22	120 00 " "	5,886
1930	356 10	169 00 " "	6,546
1931	554 25	262 00 " "	*3,999

NOTE.—Charges for 1930 and 1931 also include maintenance on 11-foot strip of concrete 1.30 miles long, built in 1928.
*Southwestern Boulevard open to traffic.

ACKNOWLEDGMENT.—From a paper presented before the Tenth Annual Asphalt Paving Congress.

Supreme Court Approves Lower Public Utility Rates

AN important decision was rendered on May 8 by the Supreme Court of the United States which may be interpreted as an aid to efforts of cities and public utility commissions to lower the rates of public utility companies. It was in the case of *Los Angeles Gas & Electric Corporation v. Railroad Commission of California.* The opinion of the Court was delivered by Chief Justice Hughes.

The California Commission had made an order in November, 1930, reducing the gas rates of the corporation by an amount estimated to decrease the gross revenue 9 per cent, or $1,300,000. The resulting revenue was expected to yield a net return of 7 per cent on the undepreciated fair value of $65,500,000 for 1930, as determined by the Commission. The corporation contested the order, claiming a property value of over $95,000,000, but lost in the Federal district court.

The Commission determined the "historical cost" of the property to be $60,704,000 in 1930. This was based upon an early appraisal, giving a rate base of approximately $12,500,000 in 1916, which was increased by the net additions as charged on the company's books. This cost included about 6 per cent of structural overheads charged to capital by the company, and also about $10,500,000 for a gas manufacturing plant no longer used, natural gas being supplied. The company had accumulated a depreciation reserve of $9,350,689 against its gas property, by the end of 1929.

Various estimates of reproduction cost new were made by engineers of the company and the Commission, ranging from $60,000,000 to $98,000,000. The valuation sought by the company included, besides $12,134,665 as the reproduction value of the manufactured-gas plant, structural overheads of 24.27 per cent; also $9,228,667 as "going concern value," $5,921,470 as "cost of financing," and $2,500,000 as "promoters' remuneration." The last two items were decisively rejected by Commission and Court as too conjectural.

The Commission's praiseworthy omission of a separate allowance for going concern value was neither censured nor approved, it being pointed out that the excess of the total value allowed over the historical cost—$5,618,235 after deducting $3,000,000 for unused plant and increasing structural overheads from 6 per cent to 11.25 per cent—might be considered as making up for any omission. It is to be hoped that some day the Court will recognize the incompatibility of rate regulation and the concept of going value as a separate element in valuation.

The Court approved the Commission's value of $65,500,000 and the 7 per cent return as being fair to the company. Mr. Hughes reiterated that both actual cost and reproduction cost should be considered. He stated that "the property, on any admissible standard of present value, may be worth more or less than it actually cost." and noted in this instance that "the historical cost of the far greater part of the fixed property appears to have been taken at price levels which were higher than those which have obtained in the period to which the prescribed rates are applicable." However, the Commission's finding of value was substantially above historical cost, and was very liberal to the company in making no deduction either for depreciation, estimated by the Commission as at least $7,650,000, or for the unused plant. Hence the Court's approval is not especially decisive, and valuation remains in a large degree the muddle that has long cursed attempts to regulate utility rates.

While holding to the present-value theory, the Court's opinion emphasizes its uncertain character. At one point it states, "The determination of present value is not an end in itself. Its purpose is to afford ground for prediction as to the future. . . . But we know that the estimates of present value, taken as the cost of reproduction as of December 31, 1929, based upon average prices from 1926 or 1927 to 1929, furnished no dependable criterion of values in the succeeding years."

H. M. OLMSTED.

Unemployed Labor Used to Increase Water Supply in Bristol, Conn.

By CARLETON W. BUELL
City Engineer

THE matter of keeping men employed who want to work and cannot get work, owing to the maladjustment of supply and demand, is one of the most vital problems to be solved at the present time. As every engineer, public official and citizen is interested in how other communites are handling the situation, this review of how Bristol, Conn., handled one job may give some reader an inspiration.

Bristol is an industrial city, manufacturing clocks, ball bearings, springs, iron castings, brass, trunk hardware, shears, etc. The population shown by the 1930 census was 28,500. The water-supply system is owned by the municipality. A Board of Water Commissioners controls and operates the plant and is solely responsible for its financial condition and the adequacy of the supply. The Department is financially independent of the city finances. All operating expenses, including interest on bonds, and additional water supply, must be taken care of from operating revenue. The water rents in Bristol are as low as, and in most cases lower than, in other cities of its size.

During 1929 Metcalf & Eddy, of Boston, Mass., were asked to submit plans and estimates for additional water storage. Their plan recommended raising No. 5 reservoir 10 feet, increasing the storage capacity from 95,000,000 gallons to 201,000,000 gallons, and the water surface from 24 acres to 39.5 acres. This reservoir, built in 1921, is located in the Harwinton hills, remote from any house and 8½ miles from the Bristol Water Co.'s office. The dam is of the earth gravity type, 46 feet high, 500 feet long, and 10 feet wide at the top, with the upstream face paved on a 1 to 3 slope. The downstream face was a 1 on 2 slope about halfway down the face to a 3-foot berm; below the berm the slope was 1 on 2¼. The material on the face of the dam below the berm consisted of cobbles and field stone covered with gravel and loam, having a maximum depth of about 6 feet near the toe and decreasing to 2 feet at the berm. The spillway was through four 2 x 8-foot ports into the gate chamber of the gate house, the overflow being taken through the bottom of the dam by a 48-inch pipe.

Features of the Construction Required

The plans for raising No. 5 reservoir 10 feet called for a dam 16 feet wide at the top, the upstream edge of the new top to be directly over the downstream edge of the top of the original dam, and the upstream face to be paved on a 1 on 2 slope to meet the 1 on 3 slope of the old paving. The downstream slope was 1 on 2 to a point halfway down the face, where there was a 6-foot berm, and below the berm the slope was 1 on 2½. Before placing the additional fill, the plans called for the removal of the old stone facing and the stripping of loam, and the stepping of the original dam face. The 48-inch pipe was to be extended to the new toe and to be protected by a concrete head wall. The old brick gate house and reinforced gate chamber were to be razed to the spillway ports and rebuilt to the new level.

The raising of the reservoir made necessary a dyke 750 feet long, the south end of the dyke being about 300 feet north of the west end of the main dam. This dyke was to be 8 feet wide at the top, with 1 on 2 slopes and with the upstream face paved. A 30-foot concrete spillway was to be built about 150 feet from the south end of the dyke. The maximum height of the dyke was 8 feet, and all material for the dam and dyke fill was to be taken from the basin of the reservoir east and southeast of the dyke. This fill material was of a clayey, hardpan nature. From this description it will be seen that the work presented no great constructional difficulties, and, aside from the building of the gate house and removing the stone facing, was not particularly hazardous.

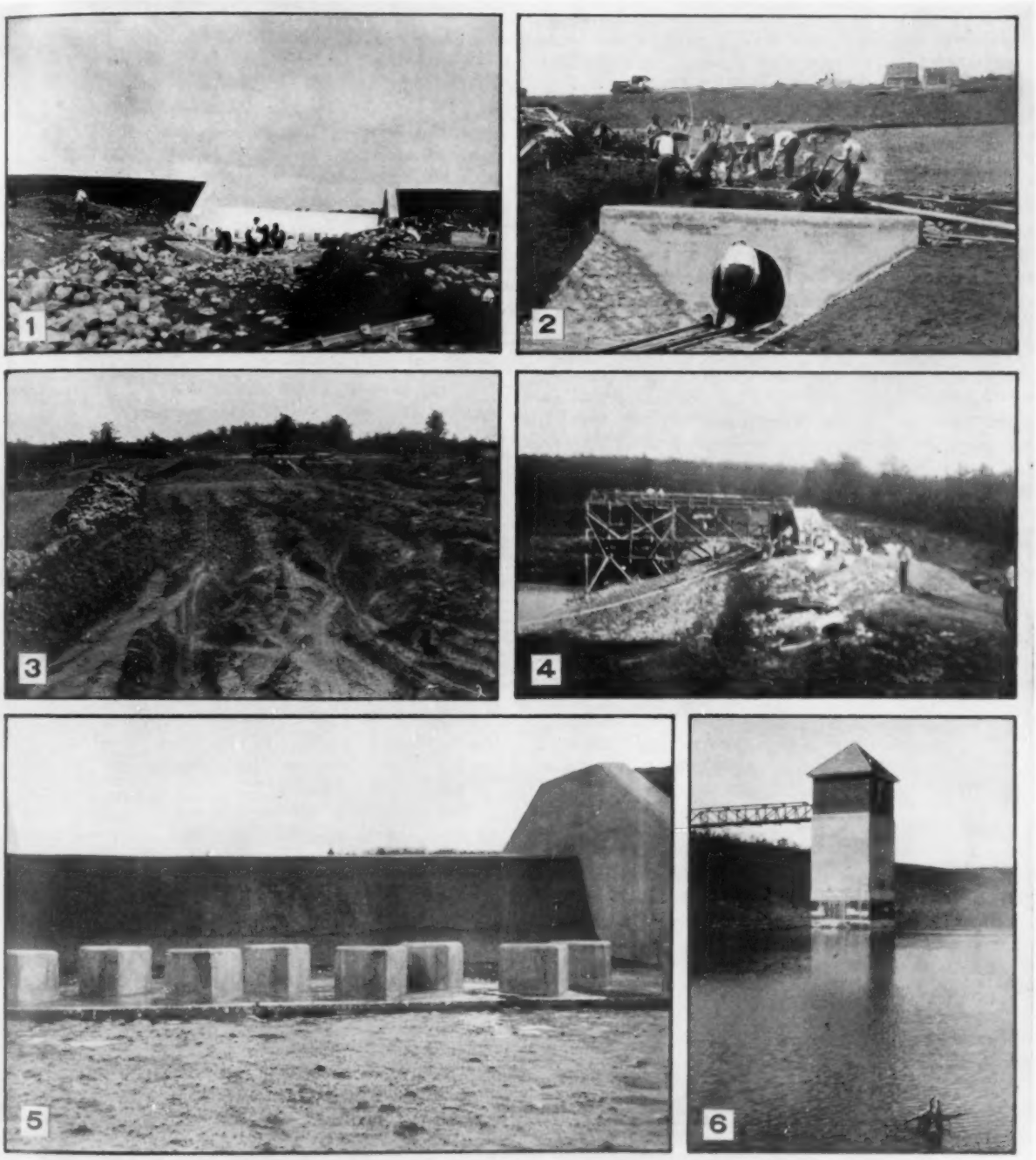
During the latter part of 1929 and the early part of 1930, the water consumption in Bristol fell off sharply and the raising of No. 5 reservoir was indefinitely postponed.

Plan Revived as Employment Relief Project

The 1930 and 1931 unemployment situation was met by putting the unemployed to work on various public improvement jobs, such as grading and straightening highways, cleaning up the parks, etc. An Emergency Relief Committee had charge of investigating and selecting the persons put to work. All the cost was paid by money raised by taxation. As the unemployed increased, it was soon evident that the cost could not be met by taxation and keep taxes within payable limits. The Board of Water Commissioners were asked to consider the possibility of putting men at work raising No. 5 reservoir. The Board realized the desirability of doing the work at this time; but would it be good business to over-capitalize the Department and later find it necessary to increase water rates in order to carry the capital load? The cost to raise No. 5 reservoir, using 1931 prices, was figured to be $51,000. The 1929 estimate was $70,000. Available data showed that additional storage would be needed as soon as consumption returned to the maximum 1929 figure. It would probably cost more to build at that time. The Board concluded, in view of present conditions, that it was using reasonable judgment in deciding to build now.

The general arrangements for doing the work were sim-

ple. The Water Department had full charge of the work, and paid all bills, including unemployed labor up to the sum of $51,000. All costs above this figure were paid from the unemployment appropriation of the city. The Emergency Relief Committee selected the men for the work. These men reported to the Water Department office at 6:45 A. M. All unemployed men received 40 cents per hour, regardless of ability, training or experience. The working day was eight hours; later it was changed to ten hours, owing to the cost of transportation. The unemployed worked in three shifts, four days work and eight days off. There were to be about 60 men in each shift. The Water Department had the right to dismiss any one found detrimental to the work, and the firing was done by notifying the Emergency Committee not to include the man when his shift came on again. There was some firing from the first three shifts of those who unmistakably showed a mental attitude that would be disastrous to the successful prosecution of the work. After this first sorting, the personnel of the shifts remained



SCENES DURING THE RAISING OF THE HEIGHT OF NO. 5 DAM, BRISTOL, CONN., BY HAND LABOR
1. The new spillway and dyke. 2. The 48-inch outlet and beginning of the fill. 3. Early stages of the dyke. 4. Start of the gate-house building. 5. First water over the new spillway, December 10, 1933. 6. The completed gate house, and the reservoir partly filled

about 90 per cent the same during the job. No men were dismissed owing to lack of physical or mental ability. The Water Department had the right to use any or all of their regular force as conditions demanded. The Water Department force was used to place the pump and to lay pipe lines for wetting down the fill. Also, on days when concrete was poured, these men were placed in the key positions. As a rule, about six regular Water Department men were on the job every day, three of whom would have been laid off were it not for this extra work. They received 50 to 60 cents an hour, according to their regular Water Department rating. The Water Department had the right to select men from the shifts to work continuously. The timekeeper was so selected and worked every day. Later, all men who could lay riprap or cobble gutters were kept on the job continuously. Only two persons were used on the job outside of the unemployed and the regular Water Department force—a carpenter foreman, who with the help of the gang built all the concrete forms, gate-house roof, etc., and a masonry foreman for the brick work on the gate house.

A crawler tractor was rented from the City Public Works Department. This was used to roll the fill, haul stone on a stone-boat for the riprap, and pull stumps; and, most important of all, it was always ready to help a truck in trouble.

A ¾-yard gas shovel was hired. This shovel loaded all the fill for both the dyke and the dam. A steam shovel was also hired for about two weeks to load gravel used under the riprap, on the downstream face of the dam, and for surfacing about 1,000 feet of road. The rate paid for power shovels, including operators, was $4.00 per hour.

The trucks for hauling dirt were hired at a rate ranging from $2.00 to $1.35 per hour, including the driver, the rate depending on the size of the truck. A passenger bus was hired at $10.00 per day, to aid the regular Water Department trucks in carrying the men to and from the job. The owners of all hired equipment agreed to pay back taxes, water rents and assessments from the money earned, at the rate of at least 50 cents on the dollar, until such bills were paid in full. About $6,000 of old bills were settled by this arrangement.

Progress of the Work

Work was started June 27, 1932, and finished December 1, 1932. The job moved with remarkable smoothness from start to finish, due in large measure to the ability of the Superintendent of the Water Department, and of his foreman in direct charge of the work, to use the material they had to work with to the best advantage. The summer of 1932 was dry. This was very fortunate, because the trucks in making the lower part of the dam fill had to go down and up a very steep grade. During the latter part of October and in November the job was stopped three or four days at a time, on account of rain and the slippery condition of the clay, but then the end was in sight and the delays did not lower the morale as much as such delays might have done earlier. Most of the men sent to the job were in good physical condition, and most of them wanted to do a day's work. Men physically unfit for shovel work were shifted to the brush gang or some other job they could do. There were about 8 acres of land to be cleared around the reservoir.

All through the job, man power was used freely to keep the shovel and trucks running full speed. At first we tried tailboard spreading, but on account of the lumpy, wet and dry condition of the dirt, this operation slowed down the speed of the trucks; by using man power for spreading, the trucks were speeded up enough to pay for extra labor. The roads from the shovel to the dam were patrolled and kept free of places that would have delayed the trucks. The almost wanton use of man power to keep the machinery moving was not all waste, for the shovel and truck cost of moving dirt was kept close to 20 cents per cubic yard for the entire job. In laying riprap and cobble gutters, enough men were used so that the men who knew how to place the stones did nothing but that. The cost of placing riprap was about one-half what is usually paid for this work. Forty cents per hour is the explanation. The removing of the stone face from the old dam, the stripping and stepping, was all done by hand labor at a cost of about $1.00 per cubic yard.

In mixing concrete for the spillway, two one-bag mixers were used, and plenty of men. In two pourings of 68 yards each, the first was made in 7½ hours and the second in 6 hours. In each case about half the concrete was dumped into the forms direct from the mixer, and the rest poured from wheelbarrows. One pouring of 104 cubic yards was made in 8 hours, all the concrete being dumped direct from the mixers into the forms. The cost of mixing and placing concrete, including cost of mixer, ran very close to $2.80 per cubic yard. The men were allowed 10 hours' pay for each pouring.

Costs

The cost of the total job was $51,678.28. The following figures show the proportion of the cost received by the unemployed, and other expense distribution:

Unemployed labor	$20,385.00	39.4%
Water Department labor	7,520.43	14.6%
Water Department trucks, compressor, pump	1,199.88	2.3%
Hired trucks, shovels, mixers, tractor	8,607.74	16.7%
Hired transportation for labor	1,085.00	2.1%
Engineering	4,621.49	8.9%
Material	6,148.79	11.9%
Insurance and miscellaneous expense	2,109.95	4.1%
	$51,678.28	100%

Including truck drivers, shovel operators and engineering staff which would have been unemployed but for this work, the total labor cost was approximately 62.5 per cent of the total expenditures.

Notwithstanding the employment of a large number of unskilled laborers, there were only three real accidents on the whole job: one man had his ribs fractured while placing forms, and two men who were cutting brush cut themselves quite severely. Of course, there were many minor bruises, scratches and the like.

It is a pleasure to work on a job with plenty of man power. I am convinced that with man power at 40 cents per hour more men can be used on jobs comparable to the raising of No. 5 reservoir than has been our habit in late years and still not increase the total cost. By judicious use of the extra men, the machinery cost can be reduced enough to balance the human payroll.

The American City Is Not Copyrighted.
When quoting, please give credit.

The Place of Powdered Activated Carbon in Water Purification

By **F. E. STUART**
Research Engineer, Water Purification Division, Industrial Chemical Sales Co., New York

UNLIKE most chemicals used in routine water purification, activated carbon, being insoluble, removes tastes without contributing other tastes and without adding anything to the water. When its work is done, it is completely removed along the adsorbed impurities, none of it being passed on to the consumer. During the two years 1931 and 1932, the use of powdered activated carbon has grown to a remarkable degree, and now a great number of water treatment plants employ this product as regular application in their treatment process. Although the primary reason for the application of activated carbon in water treatment is that foul tastes and odors may be eliminated from the water, it has proved to offer several additional advantages.

History of Its Use

For generations wood charcoal has been a household remedy in the purification and sweetening of water stored in cisterns. The value of charcoal in water purification has been recognized since 1807, if not earlier. Interestingly enough, the gold prospectors operating in Australia years ago made a practice of adding their campfire ashes, containing bits of charcoal, to contaminated or stagnant waters, and as a result produced, for their consumption, a purified product.

The early pressure filter installation at Atlanta, Ga., made use of a mixture of sand and granular charcoal collected from the cinder traps on wood-burning locomotives. This was in 1893 and is believed to represent the earliest use of charcoal in water filtration in America, if not in the world. In England, about nineteen years ago, activated carbon was for the first time used in pressure type filters primarily for the purpose of removing chlorine and other tastes from chlorinated water. Activated carbon was produced by the Industrial Chemical Sales Co. in America as early as 1914, but it was not used to any practical extent in the water purification field until 1929. Pioneer work with granular activated carbon was undertaken in 1927 by John R. Baylis, in the experimental filter plant in Chicago, Ill. As a result one or two plants have been equipped with activated carbon contact filters.

Realization that the use of granular carbon was proving prohibitive because of the first cost of installing the contact unit led to experimentation with powdered activated carbon applied to the water ahead of the existing sand filters. Credit for the pioneer efforts leading to the practical application and economical use of powdered activated carbon as a taste removal measure must be given to George R. Spalding, at the New Milford, N. J., filter plant of the Hackensack Water Co. Spaulding first applied powdered activated carbon on a plant scale in the spring of 1929. The use of Aqua Nuchar from this time has increased with rapid strides and through a variety of procedures.

The Action of Powdered Activated Carbon

Nuchar is of an exceptionally low density, weighs 16 pounds to the cubic foot, and is of such physical composition as to insure the passage of 94 per cent of its weight through a 200-mesh screen. Its fine particle size and its low density and great porosity offer an enormous exterior and interior surface, thus insuring that this carbon remains in contact with the water for very long periods before settling out, and it is while in suspension that the carbon gets in its most effective work.

Odors and tastes in water are derived from dissolved organic products and gases in the water. These are quickly adsorbed and removed along with the carbon during the process of sedimentation and filtration. The taste-producing products may be derived from putrefied vegetable matter and from decaying algae or may be charged to industrial pollution of a stream. The most widespread objectionable tastes come as a result of decaying vegetable matter or the dead algae which during putrefaction give up taste-producing compounds to the water.

The application of powdered activated carbon to the incoming water ahead of, or along with, the coagulant at filtration works has proved advantageous also in other directions:

1. The numberless small particles in suspension create a rapid and effective floc formation, that is, the clotting of the turbidity or coloring matter normally present in surface waters. In softening processes the same phenomenon is noticed in conjunction with the formation of the insoluble calcium and magnesium compounds produced. In each case the rapidity of separation of precipitated impurities is facilitated by the presence of the carbon in suspension, and thus less suspended matter remains to be removed on the sand filters. The economical aspect of such effect is found in the requirement of less water for washing filters, and perhaps more important is the reduction of the quantity of coagulant required. Where alkali must be added normally, to improve floc formation, the use of powdered carbon reduces the alkali consumption in addition to the coagulant reduction.

2. The flocculated material settling out of the coagulated water carries down with it much of the carbon. The resultant sludge is prevented from putrefying to a very marked extent by the carbon occluded, and this effect serves as a secondary but important measure of preventing taste production during passage of the *new* water across the deposits of *old* sludge. The result is an operating economy. Less water is wasted in emptying and washing the basins, ordinarily done quite frequently if tastes from putrefying sludge are to be eliminated. Taste imparted to otherwise tasteless water by the putrefaction of sludge in settling basins is more prevalent than heretofore realized, and that difficulty is largely eliminated when powdered carbon is employed.

3. The use of powdered activated carbon serves to reduce the chlorine requirements in that the colloidal and soluble organic matter and gases of decomposition are adsorbed and removed. The chlorine demand of carbon-treated water becomes practically a constant value rather than a variable. Not alone does this reduce chlorine consumption, but it renders more certain the adequacy of a uniform dosage of chlorine to the filtered water without the necessity of fre-

quent changes in rate of application to meet varying qualities of the water being dealt with.

4. When carbon is applied with prechlorination, the same phenomenon is noticed and, strangely enough, the residual chlorine in passing through the basins to the filters is held at a more nearly constant figure than is observed when carbon is not applied. The presence of carbon in low concentration, such as used in water purification practice, does not dechlorinate the water during passage through the basins. In passing through the filter, on which of course a portion of the non-settling carbon is deposited, complete dechlorination is effected and the effluent resulting exhibits no chlorine demand. Thus, the post-chlorine dosage is practically all recovered in the form of available residual chlorine, and in consequence a dosage of constant amount can be depended upon.

5. Chlorine present in water in a rapidly oxidizing form, such as free chlorine, hypochlorous acid or hypochlorite, is completely removed during passage through filters in or on which carbon has been deposited. Chlorine in the mildly oxidizing state (when present as mono- and di-chloramine) will only be partially removed during the filtration step in the process. In taste removal procedure with activated carbon it appears to be questionable practice to employ the ammonia-chlorine process in prechlorination practice. Most dependable results are secured from the use of chlorine alone and in the quantities found requisite to insure the presence of residual chlorine on top of the filters and to rely upon complete dechlorination during passage through the filters. If desirable to maintain residual chlorine through the distribution system, ammonia may be used in conjunction with post-chlorination and thus render it practicable to maintain the desired concentration of available chlorine in the finished water without production of a chlorinous taste in the already chlorine-saturated water.

Methods and Technique

In general there are two proved methods of application of powdered activated carbon. In either case the powder is added to a minor flow of water which converts the dry material into a thorough suspension prior to its admission to the major flow of water to be treated. The equipment involved may be:

(a) An ordinary dry chemical feeder equipped with a solution box or a water-operated ejector

(b) A solution tank equipped for continued mechanical or compressed air agitation

The early application of powdered carbon was direct to the water entering the filters, and it continues to be so applied at several plants where the quantities of carbon required do not exceed 16 pounds per million gallons—or 2 parts per million. This scheme has proved most effective when prechlorination is practiced, and offers the most immediate relief in cases where unexpected odors or tastes are encountered. The procedure can be used in emergencies or for short periods, even with the knowledge that filter runs may be shortened when more than 16 pounds per million gallons is the dosage of carbon added to the applied water.

A procedure which is more generally attractive, from the standpoints of over-all effective taste control and of the previously mentioned incidental benefits and economies consists of application of the carbon emulsion to the raw water ahead of the coagulation basin, along with the coagulant or after addition of the coagulant. In conjunction with prechlorination the carbon may be applied prior or subsequent to the chlorine. Usually the results have been more effective where the carbon has preceded the chlorine. In this practice, higher residuals of chlorine usually result from an equal chlorine dosage applied. Circumstances may alter the case, and the preferential arrangement should be determined by tests. Where taste troubles are exceptionally severe, a combination of prechlorination with pre-carbon treatment and additional carbon treatment ahead of the filters may solve an otherwise difficult problem. Some of the worst conditions encountered in the field have been remedied by splitting the application of carbon between the raw and the applied water at the filters.

Amount of Carbon Dosage

Almost universally, the quantity of powdered carbon requisite for proper taste control has been found to be between 8 and 24 pounds per million gallons, 1 to 3 parts per million. Exceptional cases have been met wherein dual application of the carbon has been required and a total dosage in excess of these requirements has been necessary. Frequently, the carbon requirements when application is made to the raw water are of necessity slightly higher than the requirements if applied at the filters. However, the several advantages named, plus the saving in coagulant, chlorine, etc., more than compensate for the slightly higher dosages required when used in conjunction with coagulation.

ACKNOWLEDGMENT.—From a paper presented before the New England Water Works Association.

HIGHWAY PLANNING FOR COUNTIES

THAT the preparation of plans for a comprehensive system of highways in a county is just as important as a plan for a city, and that such plans can be made at very little cost, was pointed out by George W. Farny, Chairman of the National County Roads Planning Commission, in a recent lecture in the series on regional and city planning given under the auspices of the College of Engineering of New York University.

"The planning of a comprehensive system of highways in a county," said Major Farny, "can be subdivided into three stages: (1) the fact-finding survey; (2) the analysis and study of facts collected; (3) the interpretation, correlation and evaluation of the factors as affecting highway development."

A fact-finding survey, such as Major Farny recommends, embodies the collecting of maps and information with regard to the population and records covering motor-vehicle statistics, gasoline consumption, highway traffic, physical characteristics of existing roads, highway crossings, traffic accidents, climatic conditions of the county, its topography and geology, available road-building material, land uses, zoning and parks, school bus and mail routes, railways, waterways, airways, adjacent territory and the general economic development of the county in question.

The importance of competent advice in the correlation and evaluation of the factors affecting highway development was stressed by the speaker:

"It is here that the real art of preparing a comprehensive plan of a system for county highways will take place. Here is where application of judgment, based on experience, is most essential. To be able to foresee the requirements of the county demands not only knowledge of facts, but foresight which distinguishes one planning engineer from the other, but in all cases such a plan should be based on facts and data collected."

An Attack on the Problem of the Disposal of Household Wastes — Part I

By **FRANK K. DUNCAN**
Assistant Chief Engineer, Department of Public Works, Baltimore, Md.

THIS article tells how Baltimore, with a population of 825,000 and a land area of 78.72 square miles, has endeavored to solve some of the problems involved in disposing of its household wastes. Baltimore has three separate collections, the ashes and garbage being collected and hauled by city forces, and the rubbish by contract. The first contract was awarded in 1926 for a period of five years. In order to eliminate the objectionable features of the numerous refuse dumps which had become a nuisance and caused many complaints from citizens, the city in 1924 completed its first incinerator for the burning of rubbish, since which time the dumps have been used only for the disposal of ashes.

This first rubbish incinerator was remodeled in 1926 from a Davis type furnace to the Moore chain-grate furnace. A storage bin was added, which increased its operating time from 8 hours to 24 hours per day and its capacity from 40 tons to 200 tons per day, in dry weather. This incinerator proved so successful that a similar one was built in 1927 with a capacity of 250 tons per 24 hours. At both these incinerators the paper, rags, bottles, iron, etc., were salvaged and sold. In 1927 the revenue from the sale of salvaged materials amounted to 56 per cent of the total cost of operating the incinerators. However, owing to the loss in sale value of the salvaged materials, the revenue had decreased to 20 per cent of the total cost of operations in 1932, so that now the labor cost of salvaging is greater than the amount received from its sale.

For the past forty years various methods of disposal of garbage have been tried in Baltimore from time to time. The garbage has been spread over the ground and ploughed in as a fertilizer; it has been disposed of by the reduction process; it has been buried in trenches; and it has also been fed to hogs. None of these methods proved satisfactory. The last contract, for a period of ten years expiring on December 31, 1931, was for the disposal of the garbage by the reduction process, known as the Arnold-Edgerton system. This contract was extended for one year, or until December 31, 1932. The reduction plant, however, was the property of the contractor.

Plans for New Incinerator

The collection of garbage had increased from 47,961 tons in 1922 to 79,508 tons in 1931, and the rubbish had increased from 83,103 tons in 1928 to 130,123 tons in 1931. There was a slight decrease in the tonnage of garbage and rubbish collected in 1932. As the ten-year garbage contract expired December 31, 1931, and the city had no garbage plant, and both rubbish incinerators were operating beyond their capacity, it was necessary to provide new means for the disposal of all the garbage and a portion of the rubbish. After careful investigation and study by the Chief Engineer's office, it was decided, in order to take care of the garbage for the next ten years, to build a 900-ton high-temperature incinerator to burn the garbage, using part of the rubbish as fuel. This was also determined to be the most economical and sanitary method to adopt, and was concurred in by Abel Wolman,

AIRPLANE VIEW OF THE NEW PITTSBURGH - DES MOINES REFUSE INCINERATOR, BALTIMORE, MD.

THE CHARGING FLOOR

Chief Engineer of the State Department of Health, who made a valuable study and report of the problem.

As is usual in most cities, certain objections were raised as to the location of the incinerator. The only one given serious consideration, however, was that the residents in South Baltimore living along the streets over which the trucks would travel on their way to the incinerators objected to having a large part of the garbage of the entire city pass their doors. For that reason, the capacity of the plant was cut down to 600 tons per 24 hours. This was unfortunate, because, with a plant of only 600 tons capacity, instead of solving the garbage problem for a period of ten years, it will be necessary to provide additional plant capacity in the near future.

The site selected was a large piece of property, zoned for industrial use, in the southern part of the city, to which the city had fortunately acquired title some years ago. While close to a main thoroughfare, the property was more or less isolated, bordering on the Patapsco River, and with an available area for fill of at least 2,000,000 cubic yards for the final disposal of the ash or residue from the incinerator.

The city, however, did not have the capital to finance the construction of the necessary plant, nor was it advisable, owing to the general financial condition, to issue bonds to provide the necessary funds.

For these reasons plans and specifications were drawn and advertised requesting bids for a 600-ton incinerator to be built on city-owned property located on Reed Bird Avenue near Hanover Street, the plant to be erected, maintained and operated by the contractor for a period of ten years, beginning January 1, 1933, and without any payments to the contractor other than unit (per ton) prices bid for collection and hauling of rubbish and incineration of garbage and rubbish. The plant was to be at all times the property of the city, and at the termination of the contract the city was to take possession of the plant.

Included in the contract was the collection and hauling of all the rubbish in the city for a period of five years. This rubbish was to be delivered to the two existing rubbish incinerators owned and operated by the city, except that at least 35 pounds of rubbish was to be delivered to the garbage incinerator for every 65 pounds of garbage delivered there by the city.

The city reserved the right to send additional rubbish to the garbage plant for incineration, but not to exceed the capacity of the plant. The city guaranteed a delivery of garbage to the incinerator of at least 70,000 tons per year.

Bids were opened by the Board of Awards on June 15, 1932, and the contract was awarded to The Foreman Co., a local contractor, on July 13, 1932. The plant started to incinerate garbage on January 1, 1933. The contract prices were: for incinerating rubbish—80c per ton; for incinerating garbage—$1.85 per ton (includes all costs and amortization of plant in ten years); for collecting and hauling rubbish—$4.10 per ton.

The plant cost about $415,000, or about $700 per ton.

Description of Incinerator

The incinerating plant is composed of the incinerator building, the office and toilet building, the compressor house and scrap metal baler and bins for handling bottles, broken glass and scrap metal. All structures are supported on cast-in-place concrete piles varying between 25 and 35 feet in length and driven to such a refusal that each has a safe carrying capacity of 30 tons without appreciable settlement. All the foundations are of reinforced concrete.

The office and toilet building is completely detached from the incinerator building except for a short common wall in which a door is located. This was done to keep out the dust and noise coming from the incinerator. Likewise, the workmen's toilet and wash rooms are so arranged that they cannot be entered from the office building. This latter arrangement prevents the workmen, chauffeurs and truck labor from using the office section of the structure. The office building is two stories high. On the first floor are located the operating office, the scale room and the office toilet. On the second floor are four office rooms used by the contractor's executives and clerks and the city inspectors. The workmen's toilet building is one story high. It contains two toilet and wash rooms and two locker rooms, so arranged that the white and colored labor need not mix. The locker rooms each contain two shower stalls and enough steel lockers to accommodate the men working in the plant.

This building is constructed of brick walls and reinforced concrete floors and roof. The interior walls are lined with salt-glazed brick, the ceilings are plastered on suspended expanded metal, and the floors are covered with green magnesite, except those in the toilet and locker rooms, which have a green concrete topping. The rooms are heated by a steam vapor, vacuum system employing non-ferrous radiation. Steam is supplied by an automatically oil-fired boiler located in the basement of the building. An "Excelso" water heater, attached to this boiler, supplies hot water to the wash rooms. The hot water storage tank has a capacity of 400 gallons.

The incinerator building has a steel frame, walls of concrete below grade and of brick above, and concrete floors and roof. It is divided into three principal sections: the main section, which houses the storage bin, the charging floor, the furnaces and stoking room, and the ash tunnel; the south lean-to, in which the dumping operations take place; and the north lean-to, which houses the flues, preheaters and forced draft fans. The interior faces of the brick walls except those of the north lean-to were constructed of salt-glazed tile. This was done principally to facilitate cleaning the walls and also to keep the building in a presentable condition at all times. The

cost of the brick tile was justified when compared with the cost of face brick and painting, the maintenance of the painting and the general appearance after a few years of operation. Since only a very small surface of the interior walls of the north lean-to is exposed, red face brick were substituted for the salt-glazed tile.

The roofs of the three sections consist of 3½-inch concrete slabs poured on a steel deck supported by the purlins. The steel deck is a ribbed steel sheet construction designed to support the weight of the green concrete of the roof, thus eliminating timber forms and reducing the time of completion. A wire mesh was laid in the concrete. After the concrete was sufficiently dried out, it was covered with one inch of insulation, upon which was laid the felt roofing.

The Dumping Building

The dumping building, or south lean-to, is 35 feet wide between the inside face of the building wall and the face of the dumping curb. It is 183 feet, 4 inches long, out to out of end walls. The minimum clear height inside is 20 feet, 4 inches. There are two entrances in the east end, and one exit in the opposite end. These openings are 14 feet wide and 16 feet high, equipped with electrically operated steel rolling doors. High windows with mechanically operated pivoted sash are set in the south wall, giving an abundance of light and ventilation. The floor is at grade, paved with concrete and adequately drained. Two 1-inch hose bibbs on the south wall provide convenient connections for washing the floor. A standard 6-inch fire hydrant at each end inside the building, each equipped with 100 feet of standard 2½-inch hose, provides protection against fires in the rubbish stored in the pit.

The storage bin extends the full length of the main building, an inside length of 194 feet, 5 inches. It is 15 feet, 8 inches wide, 16 feet, 7 inches deep, providing a capacity of 1,900 cubic yards. The bottom is paved with vitrified brick to protect it from the acid liquors of the garbage and the abrasion of the clamshell buckets. The bottom has a slope of 3 inches towards the inside wall, where drainage inlets, spaced about 19 feet apart, allow the liquors to enter a covered trench in the ash tunnel. The drainage inlets and trench are lined with acid-resisting tile. Manholes in the trench cover permit of easy flushing and cleaning.

The refuse materials, after being dumped into the pit, are picked up by two overhead 3-ton bridge cranes, each equipped with a clamshell bucket with a capacity of 1½ cubic yards. The refuse is then deposited into steel hoppers on the charging floor. The hoppers, constructed of ¼-inch plates, are 3 feet high and have a top opening of 7 feet, 6 inches, by 7 feet, 9 inches. The bottom is connected to a 3-foot square vertical chute at the charging floor level. This chute extends down to the charging gate placed over the charging hole in the top of the furnace. The hoppers are arranged in units of four with one unit for each furnace. An apron plate extending 3 feet, 7 inches above the top of the hopper at the rear prevents the refuse from coming in contact with the building frame and walls. The plate is continuous for the combined length of the four hopper units.

The fronts of the hoppers are open so that the charger may readily loosen materials wedged in the hopper, and may sweep into the hopper the refuse which falls on the charging floor. A steel angle in the plane on the top of the hopper and extending across the open side prevents the charger from accidentally slipping or falling into the hopper. Large windows with mechanically operated pivoted sash, in all four building walls, provide ample light and, together with twenty fixed copper ventilators, 36 inches in diameter, in the roof, furnish excellent ventilation.

The Stoking Floor

The stoking floor is 2 feet above grade and 16 feet below the charging floor. The stoking aisle in front of the furnaces is 14 feet, 6 inches wide. Ventilated sash in the end walls and intakes on the forced draft fans provide ample ventilation. Windows in the concrete wall which separates the stoking aisle from the storage bin provide light. These windows are fixed sash, to keep out dust and odors from the storage bin. Two panes in each window, set in hinged frames, provide a means of cleaning the sill on the pit side of the window. A grill of No. 8 wire protects the glass on the inside from damage by stoking tools and 4-inch steel I-beams placed vertically on about 18-inch centers protect the windows on the outside from damage by the clamshell buckets. Five cast iron radiators spaced along the stoking aisle and connected to the heating system in the office building furnish heat if required.

The ash tunnel is 13 feet, 7 inches below grade and is paved with vitrified brick on a sand cushion and 6-inch concrete base. One opening in the west end, 12 feet wide and 10 feet high, fitted with a hand-operated steel rolling door, furnishes a means of entrance and exit to the tunnel. A ramp outside this opening carries the roadway to the grade of the highway paving about the plant. A reinforced concrete stairway at either end of the ash tunnel connects it with the stoking and charging floors. This stairway has a pipe railing and is encased in concrete walls below the brick walls above the stoking floor. The ash hopper gates, sixteen in number, are in a line and provide clearance of 9 feet above the paving, thus permitting the discharge of ash directly into a standard size motor truck. Each hopper gate is fitted with a gutter, connected to a 4-inch cast iron drain line, to intercept the ash-quenching water. The drainage from the hopper, the tunnel paving and drainage trench from the storage bin

STOKING FLOOR OF THE INCINERATOR

empty into a concrete sump pit in the east end of the tunnel. This sump is 7 feet square and 12 feet deep, equipped with a Gould non-clogging sump pump. The pump has a capacity of 90 gallons per minute and a 2-inch discharge, and is operated by a one-horsepower motor controlled by a float switch.

The ash tunnel ventilating system is arranged in two units, each unit serving a pair of furnaces. Each unit is equipped with an American blower with a straight blade fan of 6,000 cubic feet per minute capacity at 1-inch static pressure. The motor is 7½-horsepower at a speed of 850 rpm. The fan is located in the space between two furnaces and discharges directly into the main chimney flue, opposite the opening in the bottom of the chimney. The main duct, constructed of galvanized iron, is 14 inches by 20 inches in section and passes in front of and above the ash hopper gates. A suction inlet 9 inches by 20 inches is placed above each hopper gate, fitted with a flap gate. This gate is so arranged that it will open with the hopper gate. A 6 x 6-inch riser from the main duct extends upward to within a few inches of the ceiling, so that the smoke and dust collecting in the pockets formed by the floor beams will be drawn out. At the end of each main duct line, a large bell near the ceiling, fitted with a damper, permits a rapid removal of smoke and dust. Clean-out doors in the fan and main duct facilitate cleaning.

Steel rolling shutters extending from the ceiling to the floor in the spaces between the furnaces in the ash tunnel prevent smoke and dust from rising into the north lean-to and the stoking room.

Scrap Metal Baler and Motor-Truck Scales

The Logemann No. 23P scrap metal baler is located outside the incinerator building. It makes a bale 10 x 12 x 18 inches. It is protected from the weather by a concrete shed 18 x 30 feet supported on four 10 x 10-inch concrete columns. The compressor house is 15 feet by 24 feet in plan, constructed of brick with a concrete roof. The inside is faced with salt-glazed tile. It houses a Logemann No. 25A two-stage triplex hydraulic pump and a 6 x 6-inch class ER-1 Ingersoll-Rand air compressor. The compressed air is used to operate the lid of the scrap metal box on the baler and to blow dust from the cranes, motors, fans, etc., which are installed in the incinerator building.

The motor-truck scales has a net capacity of 20 tons. The platform is 9 feet by 20 feet, constructed of reinforced concrete 6¾ inches thick. The pit, also constructed of reinforced concrete, has a clear depth of 5 feet, 9 inches to facilitate maintenance and repairs. It is supported on four concrete piles. This Fairbanks scale is equipped with a heavy-duty, direct-reading, full-capacity dial with a chart capacity of 40,000 pounds by 10 pounds. It is equipped with an electrically operated mechanical printer, which prints upon a specially designed ticket the actual gross weight upon the platform. The printer is equipped with a roller ticket for recording the printed weights, thus serving as a check against the single tickets. The scale is not equipped with a tare beam, which has been omitted to make it impossible for the weigher to tamper with the proper recording of the true weight of the load. The tare weight is entered on the ticket by the weigher, who also makes the subtraction from the printed gross to obtain the net weight to be paid for. The tare weights of all trucks passing regularly over the scale are frequently checked and recorded in the offices of the city and the contractor.

EDITORIAL NOTE.—The second portion of this article, to appear in July, will contain a detailed description of the furnaces, air preheater, flues and chimney, data on the test run, and on the refuse collection system used in Baltimore.

Designed Spacing of Street Trees Would Decrease Costs

"WHEN we come to examine our American city street tree planting, we find that as far as it has any design it is merely a rule-of-thumb use of parallel rows of trees," observed L. D. Cox, Professor of Landscape Engineering, New York State College of Forestry, Syracuse, N. Y., in an address on "Design with Respect to Street Tree Planting," delivered at the eighth National Shade Tree Conference, the Proceedings of which have recently been published.* "It seems to be considered almost axiomatic that all streets must have trees, that they must be in regular rows and (of recent years in our endeavors to find fool-proof varieties) that they must be of one or two kinds."

A rule-of-thumb standard, said Mr. Cox with regard to spacing, "establishes a theoretical ideal of spacing equal to the average spread of the mature tree, with the idea of permitting each tree full development and thus producing a continuous mass of foliage and a continuous line of shade.

"Without getting into a discussion of details, I might say that a more interesting type of spacing, if we must standardize, would be one that called for twice the spread of the theoretical tree, thus permitting a clear space between the foliage masses of mature trees, equal to the mass of foliage itself. This would give alternate sun and shade on the ground and buildings bordering the street. Such a form of spacing would meet the common criticism that street trees cut off the sunlight to the windows of the lower stories, and such a spacing also would be very beneficial in the growth of grass or shrubs on the parkings below. Incidentally, such a spacing would reduce the number of trees nearly one-half, and thus greatly decrease both the cost of the original planting and the annual maintenance. Inasmuch as the cost of city tree planting and maintenance tends steadily to increase, and since no street tree bureau ever has adequate funds, we see how design may be an important factor even in the practical success of our street tree planting."

* Copies may be obtained from R. P. Marshall, Secretary-Treasurer of the Conference, Marsh Hall, Yale University, New Haven, Conn. Price, 50 cents each.

A Gift of Fine Magnolia Trees as a Memorial

ANNOUNCEMENT is made by The Union County (N. J.) Park Commission of the gift of 600 young magnolia trees of several varieties from the F. & F. Nurseries of Springfield, N. J. These fine young trees have been planted temporarily in the Commission's nursery in the Watchung Reservation, Mountainside, and later on will be set out in a permanent location in the Springfield section of the Rahway River Parkway. Land in this area was donated to the Park System by Mrs. Agnes G. Flemer, Carl H. Flemer and F. & B. Inc., and it is proposed to create a display of magnolias here as a memorial to the late William Flemer, who was one of the early advocates of the establishment of The Union County Park Commission and was particularly fond of magnolia trees.

Fire Safety Provisions Will Help Sell City Planning and Zoning to Taxpayers

Current Report of National Fire Protection Association Committee on City Planning and Zoning Presents Data on Money-Saving Possibilities of Master Plan and on Increased Fire Hazard Due to Business Occupancies in Residential Districts

THAT fire safety provisions which promote reductions in insurance rates are valuable in convincing taxpayers of the importance of city planning and zoning, is a conclusion of the current report of the National Fire Protection Association's Committee on City Planning and Zoning, made to the annual meeting of the Association at Milwaukee, May 29-June 1, 1933.* The Committee's report traces the history of city planning and zoning with relation to fire defenses and fire prevention and also presents data tending to show that the fire hazards of business occupancies, even in the case of stores in dwellings, are sufficiently great to warrant the exclusion of these occupancies from dwelling-house districts by zoning provisions.

The Committee calls attention to the influence of present conditions on city planning and zoning in the following paragraphs quoted from the report:

The Cost of City Planning and Zoning

"Under the present distressing economic conditions, and probably for some time to come, taxpayers may be expected to be very critical respecting municipal expenses, and the cost of city planning and zoning becomes an important question. To those who appreciate its worth, the answer will be that its cost will be less than the cost of not planning and zoning, and that planning pays if it be true that a dollar saved is a dollar earned. Others must be shown that just as many of today's obligatory municipal expenses are the results of yesterday's lack of city planning, much of tomorrow's expenses will be traceable to today's failure to plan ahead. And to them also it should be made clear that the immediate cost of city planning and zoning is merely the cost of professional services rendered in the preparation of proper ordinances and in the survey and study of local conditions and the preparation of plans. No capital investment attaches to zoning, establishment of fire limits, building codes, housing and health and subdivision platting regulations. The cost of developing planned traffic thoroughfares, waterfronts and waterways, civic centers and recreation facilities, will arise only as and when the municipality feels the need of materializing what has been planned.

"To even the most critical, city planning and zoning cannot but appeal as those functions of our domestic form of government which create and conserve sound real estate values and improve housing conditions, prevent business and social losses due to congestion and wasteful development, promote improved health, traffic and fire regulations to protect life and property; also because they promote economy and efficiency in government by eliminating political expediency and group selfishness.

"The acid test of a master plan for a city is the city's ability to finance it. In the task of "selling" their master plan to taxpayers, city planners must formulate a long-term capital budgeted program for providing funds to give effect to the master plan. The same factors which fire protection engineers must consider in the planning of fire protection of the city, as might be expected, are factors in determining the insurance rates of the city. These factors are measured by a definite schedule on which points of credit are given for items favorable to fire prevention, and points of penalty are assessed for defects in protection or fire hazards. By this procedure the key rates of the city are established.

"The insurance rates on individual buildings are also affected by factors which can be controlled by planning and zoning provisions. The crowding of buildings means increased insurance rates because of charges in rating schedules for the hazard of exposure. The enforcement of wise bulk zoning operates to eliminate such crowding.

"It will often be found, therefore, that from the completion of certain features of the master plan which affect the local fire situation, tangible results will follow in the form of reduced insurance premiums, a factor which city planners will find of great assistance in support of their program.

"The fire insurance bureau having jurisdiction in the municipality involved has a staff of competent fire protection engineers who are in a position to appraise the fire insurance rating value of physical features and improvements in local ordinances and fire defenses. Much of their effort, in fact, is directed to the improvement of the fire situation of cities, so that it will be apparent that city planners and fire protection engineers of rating bureaus and other organizations can be of material assistance to each other. By this cooperation, municipalities will save money, not alone on insurance, but through possible reduced costs of fire-fighting facilities, and those promoting fire protection will secure the needed improvements in physical features affecting fire defenses.

". . . . City planning and zoning must be done through the coordinated effort of engineers, architects, lawyers, economists, and realtors, and the challenge to do it well comes to none more pressingly than to fire protection engineers."

The Hazards of Business Occupancies in Residential Districts

The Committee presents statistics showing that the average loss per fire in occupancies which are combined stores and dwellings is on the average 2 1/7 times the loss per fire in buildings occupied solely as dwelling houses. This is deduced from an analysis of statistics reported by 28 municipalities with a population of 6,406,000 in the 17 states of New York, Connecticut, Massachusetts, Pennsylvania, Maryland, Illinois, Iowa, Wisconsin, Minnesota, Washington, California, Arkansas, Tennessee, Texas, Louisiana, Oregon and the District of Columbia.

---

* Obtainable from the National Fire Protection Association, 60 Batterymarch St., Boston, Mass.

Taxes and "The Little Old Home Town"

When We Talk About the Burdensome Cost of Government, Just What Do We Mean?

By **J. L. HARRISON**

IF one may judge from what he hears and from what he reads, no one likes to pay taxes. Just why this is true it would not be easy to say. Men pay for other things—meet their other obligations—without much complaint, usually with none at all. Many really enjoy spending their money. But when it comes to paying taxes, the situation is different. For some reason, every tax bill appears to be an imposition—an injustice—often an outrage! And just at present the public attitude toward taxes is more antagonistic than usual, for the country has recently been flooded with propaganda of all sorts in which the iniquity and the extravagance of government is presented in lurid terms and the demand for a reduction of the expense of government is urged as desirable, necessary, even as the outstanding remedy for all of our many economic ills.

As one reads such propaganda or listens to it as it floats over the air in bombastic broadcasts, it is impossible altogether to avoid the somewhat cynical conclusion that ignorance has become a virtue and that intellectual honesty is much more easily associated with the management of governmental affairs than it is with the currently popular propaganda which business and other organizations are directing against the cost of government. This is, perhaps, not surprising. A propagandist has definite objectives. He has found the creation of hysteria a useful approach to these objectives. As a rule, a calm appraisal of facts doesn't stir up a great deal of hysteria. So, why bother about facts?

But to the engineering mind and to many of the more thoughtful among all classes of men, facts are still rated as useful things. On this account perhaps it may not be amiss to inquire a little more deeply into the origin of what we are so often told is the recent outrageous increase in the cost of government. And in making this inquiry, I shall not quote figures to the nearest dime, for they are not at the moment available to me. Rather I shall paint a picture in which money values are given in round figures but in which relative values are carefully preserved—a picture which will, in general, represent your home town as well as mine and will show that, after all, neither the management of government affairs nor the tax bills are much to be criticized.

The Town That Was

My "little old home town" is situated in a prosperous farming region in Nebraska. When I was a boy there, it had a population of some seven or eight hundred. Today, it is some forty years older and has a population of about a thousand. Throughout the country there are several thousand other towns which are very much like it—a few stores, a restaurant or two, a bank or two, a couple of grain elevators, a mill, a theater, three or four churches, a good school building—and a couple of hundred residences. Yes, there are thousands of towns just about like it!

When I lived there, the cost of the town government was small. Relatively speaking, the cost of *government*—in the dictionary sense of "control, direction or restraint exercised over men in communities"—always is small. Sometimes this is forgotten. Government as such involves only a very few functions—the making of laws, the preservation of peace and the enforcement of justice. That is about all there is to it.

The governmental organization in the home town consisted of a mayor, a town council, a justice of the peace and a town marshal. The mayor and the council served without compensation. The justice of the peace collected a few fees. The town marshal was the only salaried officer of the town. He was paid about $40 a month. The total tax on account of the town government was less than $1 per capita.

In addition to the cost of the government, there were, of course, expenses for a few other things. Some work was done on the streets. The poll tax of $1.50 levied against all males 21 years of age or older paid for such work of this sort as was performed. It amounted to little either in effort or accomplishment. But no one cared very much. The demand for surfaced streets lay in the future.

The town also maintained an excellent school. This, in those days, was financed out of the license fees exacted from the six or seven saloons then existing in a more or less prosperous condition. Five teachers cost the town about $2,000; the principal another $1,000; the janitor about $600; books, fuel and miscellaneous expenses, another $1,000 or so. The balance of the $6,000 to $7,000 collected from the saloons was used in paying the indebtedness on the school building, which, for those days, was rather a pretentious affair.

The Community as a Group of Individuals

But the cost of these things—streets and schools—is not an expense for *government*. Too often this is not clearly appreciated. Nor is this surprising. Today the cost of maintaining streets and schools and other things is collected on the same tax bill that covers the cost of government. Nevertheless, these costs are no part of the cost of government. Rather, in fact, the cost of these things—services, facilities or what not—is the cost of what the community has seen fit to buy as a group rather than as individuals.

Any man who wishes a car can obtain one if he has the money with which to pay for it. But the car is of very limited value until he also has a street on which to drive it. He buys the car as an individual and takes a year or more to pay for it. He buys the streets over which to operate it as a member of a group, and takes perhaps 20 years to pay for them. But there is no essential dif-

ference in the nature of the two transactions. He buys streets as a member of a community only because it has been pretty satisfactorily demonstrated that that is the easiest, the most economical and the most satisfactory way to buy them. All of which is of less consequence than the fact that both in buying the car and in buying the streets over which to operate it he was doing exactly the same thing, though in a little different way—that is, providing something he needed and wished to have.

Today the tax bills sent out in the little old home town look very different from the way they looked forty years ago. Still, the cost of government has not changed a great deal. The mayor and the town council still serve without compensation. The justice of the peace still collects a few fees—not many, for it is a quiet town. The town marshal has been made over into a "traffic cop" and given a car. His salary has been increased as have other salaries, but, car and all, he still costs the town not much over $2,000 a year. True, that is $2 per capita where it was only $1 per capita forty years ago. But this cost is not excessive and not out of line with changes in the cost of other things. No, the cost of government is not excessive.

The Town Becomes Civilized

But in the field of community buying the story is very different. People got tired of going to their pumps on cold mornings—or going there at all, for that matter. The ladies were a factor. Going out to the pump for water simply was not being done! That ended the matter! The town installed a modern water-supply system. It was a good investment. Practically from the start, it has been self-supporting. Usually, it returns a modest surplus which can be used for other purposes.

Before long, kerosene lights began to look awfully passé. Twenty years earlier the most aristocratic housewife had been proud of them, had exhibited a new one to her friends and her neighbors as the marvel of the age. The kerosene light had not failed. By no means. The light it provided was as good as ever. But how "messy" and how out of date it suddenly became, when pushing a button would turn on a brilliant electric light. So the town put in an electric light plant. This, like the water works, proved a success. It has always carried itself and usually has carried the street lighting as well.

But when we modernize, we do not stop with water and lights. Taking a cold bath in a tin tub never was much of a pleasure. For some reason people began to object to having garbage emptied in the town streets. They even objected to having it thrown into the alleys. Slop of all kinds was getting onto peoples' nerves. The result? Why, a sewer system, of course. Prices had advanced a good deal, but $50,000 would—and did—take care of the problem very nicely. It became a high crime to have anything messy about. Progress? To be sure. Government? Not at all! As a community, the people wanted these things, and as a community they purchased them just as any individual may desire a car or a coonskin coat and thereupon set about to secure it.

But the sewer system was not a profit-making venture. It had to be paid for out of taxes, so the tax bills began to increase. Streets followed. People did not like to get their cars dirty on mud roads. They wanted to use them without regard to the weather. Mud and slush, and ruts when the roads are frozen, are hard on tires and hard on tempers. It was a good deal easier and a great deal more comfortable to borrow $50,000 and fix up the streets. No town of its size today has better ones. But, at that, it might be well to remark that government did not force this improvement. The people demanded it, and the people—the citizens themselves—had this work done.

Then the old school got to looking pretty shabby. When the saloons were abolished and the cost of the schools showed up for the first time on the tax bills, there was a general feeling that education was a pretty expensive thing. But people became accustomed to paying for the education of their children in the more modern way. Then, too, times were good and everyone was prosperous. So when the old school building got to looking old and inadequate and a "noted educator," somewhat publicly, remarked to a "leading citizen" that the schools were getting behind, it was surprisingly easy to borrow $100,000 for a new building and to double the teaching staff.

One might, with propriety, mention other minor details in the program of modernization—the new fire house, the up-to-date fire-fighting equipment, a small but very well constructed jail, an improved town hall, etc.—but all these things, even the total of them, constitute a relatively small burden on the town. It was the other improvements, including the schools, which generated the tax bills.

Costs of Town Services and Government
(Exclusive of Water and Light)

Briefly, these at present summarize about as follows:

Interest on debt (of $150,000)	$7,500
Sinking-fund	6,000
Maintenance and repairs on sewer system	1,000
Maintenance and repairs on streets	500
Schools—	
10 teachers	8,000
1 principal	2,500
1 janitor	1,800
Books	500
Coal and miscellaneous expenditures	900
Annual cost of community purchases	$28,700
Annual cost of government	3,000
Grand total	$31,700

A little of this cost is paid out of profit on water and on lights, but, after allowing for these profits, which are not large, because street lighting must be absorbed by the light plant before any profit remains for the liquidation of other expenses, the average per capita tax bill is not far from $30. This is a really sizable tax bill, and when it is compared with the visible tax rate of about $1 which prevailed forty years ago, it presents the appearance of an enormous increase. Even when the taxes formerly collected through the saloons are added to the visible tax rate of forty years ago, the increase is still impressive.

But, after all, this is not the matter which deserves emphasis. Rather, the thing which should be stressed is that the cost of the town's strictly governmental functions has not increased in any alarming fashion. It remains a cost of reasonable proportions, and there is no reason to suppose that the future will show a different situation here.

Suppose Private Business Ran the Town!

The great change that has taken place is in the amount of the service and the facilities that are being purchased on a community basis. And just here is an important

thought. It is possible to buy light and power, water, education, even sewers and streets from privately owned companies just as we customarily buy automobiles or food or clothing. It has been done. Indeed it is being done to some extent in many places today. But the fact that it is being done less and less (except in the field of power and light), and that more and more these things are being purchased on a community basis, is tremendously suggestive of the fact that far from being the incompetent and corrupt playthings of unscrupulous politicians, our town and our city governments are relatively so efficient that *the public finds community purchasing through established governmental organizations the safest and the most economical means of securing many of the services and the facilities modern standards of living require.*

Finally, let it be recorded that the volume of community purchasing has not increased because government is ambitious for an increased scope and for increased authority. The genesis of all of these things lies in the people themselves. They have wanted these things and they have purchased them. That is all there is to it. Today the commitments they have made in the more prosperous past loom large. In retrospect some will, no doubt, seem extravagant. But the fact that some now seem extravagant subtracts nothing from the fact that the people purchased these things because they wished to have them, and purchased them through their local governments because they had confidence in the integrity and efficiency of their governmental organizations.

In the facts as they stand there is little reason to question the correctness of the conclusions the public has reached in regard to this matter. There is even less reason to demand sharp reductions in the cost of government, so-called. Greater efficiency where it can be had? Certainly! The elimination of waste? By all means. Beyond these possible savings,—and they are not large,—reductions in the so-called cost of government can mean only one thing—the elimination of services for which the public is paying because it wants these services. It may be necessary to make such eliminations—in some cases no doubt it will be—for there are communities in which the public has bought "not wisely but too well." But even after this is admitted, the fact still remains that the public bought very desirable things—things obviously needed in the maintenance of a comfortable standard of living, and that, if as individuals they must now pay out materially less, they must also get along without some of the things they have been purchasing!

Shall We Go Backward—or Forward?

Yes, we can go back to the old pump—even the older open well. The old water supply is still in the ground. Kerosene lights are as cheap as ever. The streets and the alleys are still available for garbage disposal. Old-fashioned tin bathtubs are still to be had, and the price on them is attractive. They even paint pretty pictures on them now-a-days. Education can be abandoned. Most youngsters do not seem to care much for it anyway. Yes, we can go back to these things, and we can save a lot of money by doing so—perhaps. But who wants to? My guess is "Not many."

And, in closing, may I add a word of appreciation. The men who were managing the affairs of my little old home town when as a boy I lived there, and the men who have managed it since, have been among the squarest groups of men I have ever met—clean, honest, God-fearing citizens in the town they loved and served. That is one reason why the people there have purchased so much as a community and why they will continue to do so in the future. After all, isn't that true of your town, too? If not, there is a real challenge for you in the present emergency to help make it true in the years ahead.

America's First Municipal Enclave of Economic Rent

AT Collierville, Tenn., where the population is no more than 1,000, steps are being taken toward operating the first municipal enclave of economic rent* in the United States. Situated in an agricultural community, 20 miles from Memphis, Collierville has been inspired by the philosophy of Henry George to attempt the land-value tax plan.

Under the guidance of Abe D. Waldauer, Assistant City Attorney, Collierville officials petitioned the Tennessee Legislature to pass an amendment to the charter of the town under which the municipality has now been vested "with the widest possible powers to make use of all lands now owned or to be hereafter owned by said town of Collierville," and "to hold title thereto even though said land may not be necessary for use in the discharge of municipal purposes or functions." This act, approved by the Governor on April 21, gives the Mayor and Aldermen authority to purchase, either on the open market or at tax sales, land within the corporate limits of the town, and to lease this land for the annual economic rent, which is defined in the act to be "such annual payment for the rent of land as represents the value included in the right to use the bare land, exclusive of the value of any character of improvements on said land such as buildings, crops and trees, less any municipal taxes that may be assessed upon the lessee and upon any of said improvements." Leases may extend for not more than 99 years, the annual economic ground rent to be determined each calendar year by the governing body of the municipality.

Reasons for the measure are set out in the law. It is stated that a "critical economic depression exists throughout the nation, and the welfare of any community is made more secure by the profitable use of land, and it is advisable that unemployed citizens should go back to the soil and as far as possible maintain themselves by raising food for man and beast, and that labor should be granted easy access to land to relieve poverty and unemployment."

The vacant lot problem, which confronts many a community, can now be handled, Mr. Waldauer believes. Idle lands can be put to work. Vacant lots which are in arrears in taxes can be bought in by the municipality and leased so as to increase the city's revenue and reduce the tax delinquency. Mr. Waldauer, who is responsible for this change in tax plan, is the founder of the enclave at Wall Hill, Miss.

MARSHALL J. SMITH.

* EDITORIAL NOTE.—Fiske Warren, of Harvard, Mass., who publishes an annual volume on Enclaves of Economic Rent, has compiled information regarding fifteen enclaves varying in age from thirty-seven years down to less than two. They are to be found, for America, in the states of Alabama, Delaware, Maine, Maryland, Massachusetts, Mississippi, and New Jersey; for Australia, in Canberra; for the Straits Settlements, in Labuan; and for Europe, in France, Germany and the free-trade Republic of Andorra.

These enclaves have two guiding principles which in differing degrees they exemplify: (1) the levy of the economic rent, meaning the rent of site-value alone, for the benefit of the community whether the land is used or not; (2) the freedom of all improvements and enterprise from any levy.

If the Mayor and Aldermen of Collierville take full advantage of the powers given to them, that town will become the first strictly municipal enclave of economic rent in the United States. In the other American enclaves the land is owned by private corporations or trusts, and not by the municipality as such.

Bituminous Surface Treatments Mean More Than They Did a Decade Ago

By C. W. McCLAIN
District Engineer,
Indiana State Highway Commission,
Seymour, Ind.

THE early method of applying surface treatments was merely to distribute a film consisting of some sort of bituminous material, followed sometimes with a covering, and many times not even that. The covering applied to the early treatments usually consisted of sand, little attention being paid to the grading of it. The whole idea was to mop up the bituminous material; when that was done, the work was considered finished. It was observed, however, that a succession of such treatments built up a mushy mixture of considerable thickness, which under traffic developed into a well-corrugated roadway. This, with the slippery nature of the driving surface, created serious objections to roads and streets of this type.

The solution of the problem was so obviously simple that it is strange it was not reached sooner. Coarser covering and dragging, two very simple remedies, largely eliminated the objections. In order to do the dragging, suitable bituminous materials had to be developed. Such progress has been made along this line that no difficulty is experienced today in buying what is needed from any reliable tar or asphalt producing company.

The quick-drying bituminous materials which have been developed have eliminated a great deal of the opposition of the traveling public to surface treatments, largely on account of the splashing of passing vehicles. Objections to surface treatments while the work is in progress, and for a few days afterwards, cannot be entirely eliminated, but by proper management they can be reduced to the point where the traveling public will be more in sympathy with the efforts of highway officials to conserve and improve existing road surfaces.

Skin Treatments

The newest ideas in light treatment pay particular attention to the way the covering aggregate is handled to secure maximum smoothing effect. Traffic preferably should be detoured while the work is going on. This is better for the work and also for traffic, but if it is not possible, prompt covering of the bituminous material will largely prevent it from being picked up by traffic. Surface treating is a warm-weather job if best results are to be obtained. As set out in every good specification, the surface should be dry and clean, and no treatment should be started until the surface is in this condition.

Bituminous material for this work consists of cutback asphalt, emulsified asphalt or tar. The different grades of each have been well developed and standardized, so that the correct grade can be chosen to meet the conditions. The amount to be applied varies with the texture and openness of the surface, but care should always be taken not to use too much. If the surface is very dry and open, it is usually best to put on two small treatments rather than one heavy one, letting considerable time elapse between treatments.

The covering may consist of crushed aggregate, slag or gravel. The size should be chosen to fit the texture of the surface, if choice of sizes is available. One-inch material should be the upper limit and ¼-inch the lower, and the covering should be clean and well graded from coarse to fine. The first application of covering should be just enough to fill the drag or maintainer as it is pulled over the surface. Whatever leveling device is used, it should have a long base to give the best results. Covering should start immediately after the bituminous application and should be made either with mechanical spreaders or direct from the tail-gate of a truck. The dragging should continue until all the particles of the covering are coated and all depressions are filled. After sufficient time has elapsed to allow the bituminous material to become partially set up, the remaining covering should be applied. By allowing the material to partially set up, this added covering will stick much tighter to the surface. The dragging may or may not be continued on this last application. If a light roller is available, the surface should be rolled once over after the last dragging. If after these processes the surface shows any signs of bleeding, sufficient covering should be added to remedy it.

AN OPEN SURFACE ON WHICH NO ATTEMPT SHOULD BE MADE TO CLOSE UP WITH ONE HEAVY TREATMENT RATHER THAN TWO LIGHT ONES

Heavy Treatments

Heavy treatments are being used to smooth-up existing rough surfaces rather than merely as a surface preservative. In extreme cases hand patching may be necessary before treatments are begun. By the proper number and kind of bituminous applications and the right kind and amount of covering and dragging, very extreme cases of roughness may be corrected, and an excellent riding surface produced. Any number of successive treatments

may follow, until the desired results are obtained. Especial care should be taken on these heavy treatments to avoid rich mixtures, for they will shove and wrinkle under traffic and produce a surface more objectionable than the original. In this class of work the maintenance engineer must not be tempted by aggregates that are too fine, even though they are easier to manipulate. A much sturdier and a more nearly non-skid surface will result if the aggregate is kept as coarse as is reasonable for manipulation. A 5-ton roller is essential if the aggregate is soft. With harder aggregate the roller weight should be increased. Each application should be separately rolled. This method of heavy treatments in sealing and smoothing the many miles of old and rough surfaces existing today does not require elaborate equipment. It is fast, cheap, and very satisfactory, and is bound to come into quite general use.

Resurfacing

Resurfacing adds strength, while surface treatments aim merely to improve and preserve riding surfaces. Resurfacing products may be divided into two general classes—road mixes and plant mixes. In most of these resurfacing methods a binder course and a wearing course are specified.

The two types of surface to be treated in Indiana are an old bituminous macadam and an old cement concrete, both of which were laid several years ago. Little attention was then paid to improving the riding profile, and these roads possessed the old excessive crown. Traffic was so slow at that time that the surface was considered comfortable in riding. Now that speed is almost double, the wavy surfaces are most uncomfortable. Considerable weakness has also developed under heavy traffic. In the resurfacing referred to, a bituminous-coated aggregate binder course and a rock asphalt wearing course were used. The binder course consisted of crushed stone aggregate graded in size from 1½-inch to ¾-inch. It was coated with emulsified asphalt by the immersion process. The emulsion was timed to break about five hours after coating, which allowed ample time for manipulation.

Two methods were used in leveling this mixture. A finishing machine which has incorporated many of the ideas of a concrete surface finisher was used on several miles. The material was dumped into a hopper in front of the machine. From there the finisher distributed the material along the surface and by means of a screed and tamping arrangement laid the coated aggregate true to grade and crown. The finisher is self-propelled and depends on crawler type treads running along the shoulders for propulsion. The device has much merit in that it is fast, economical with material, and comparatively easy to operate. Its disadvantage is the fact that the shoulders have to be fairly true to grade and very compact, which sometimes entails greater cost.

The other method used to lay this binder course was to dump the coated aggregate into boxes which spread the material to the required thickness as the trucks pulled the boxes forward. After the material was so applied, for some considerable distance, it was shaped to crown and grade by an attachment on a 12-foot grader, consisting of a 24-foot shoe made of an I-beam which ran along the center of the road. This was rigidly attached to two special moldboards which replaced the regular moldboard of the grader. The two edges were kept at the same elevation by the regular grader-operating devices, the operator being guided by a level placed at right angles to the center line of the road and attached to the moldboards, which were set for the proper crown. A steel apron ran along the outside edge of the pavement to insure constant and correct width. This method proved very satisfactory but had some disadvantages. The heavy tractor necessary to pull the grader, as well as the grader itself, had to run on loose aggregate. In order to avoid so much turning, a considerable distance has to be covered before the leveler can be started. If unfavorable weather conditions suddenly develop, this unmanipulated material may set up so much that it is difficult to shape afterwards.

After this binder course was laid by either of the two methods described, it was rolled almost to resistance. About 100 cubic yards of coated stone ranging from 1-inch to ¼-inch per mile was then applied to the surface and dragged with a long-base maintainer. The purpose of this covering was to fill any remaining voids and to take out any depressions left by the roller which had resulted from unequal compaction of the previous course due to the different depths necessary in smoothing up the original surface. It was also found necessary to apply a light treatment to some of the last-rolled surface, owing to the chipping of the stone under the intensive rolling. When the surface was at this stage, it could be treated somewhat heavier and left as an excellent and serviceable driving surface if the wearing course was not to follow imme-

THE BARBER-GREENE FINISHING MACHINE USED ON THE SECTION LAID WITH COATED AGGREGATE

SHOWING HAND METHOD OF LAYING ROCK ASPHALT WITH METAL GUIDE STRIPS AND HAND LUTES

diately. The binder course had an average thickness of 2 inches loose, varying from almost nothing in the center to 4 or 5 inches along the edges in many places.

The wearing course consisted of ¾-inch compacted rock asphalt. This was laid by hand, using 1¼-inch metal guide strips for laying the loose material. One unusual thing developed in the work. It was found that the amount of rock asphalt required dropped off ten or eleven pounds per square yard from that required to lay the same thickness on the usual penetration macadam built as a base in previous practice. During warm weather the rock asphalt was steamed. Later, after cooler weather set in, it was ground. The planing and rolling was done in the standard way of handling this surfacing material.

Costs

The cost of the binder course, which was laid 18 feet 6 inches wide, was about $2,810 per mile. The rock asphalt was laid 18 feet wide, at a cost of $4,000 per mile. With 10-foot finished shoulders and a 24-inch stone strip, 4 inches deep, in each side, the total cost was about $8,500 per mile. When this method of resurfacing is used, an old pavement has high salvage value and the resulting surface is excellent. With the great mileage of all surfaces now existing and the insistent demand for economy, road builders would be betraying their trust if they did not give most serious consideration to protecting and preserving the enormous original investment.

ACKNOWLEDGMENT.—From a paper presented at the Nineteenth Annual Road School at Purdue University.

Tax-Gatherers More Needed Than Budget-Slashers

THE fact that budget-balancing by vigorous methods of tax collection is wiser municipal statesmanship than elimination of needed public services, was given special emphasis at a conference in New York last month attended by state, county and municipal officials, executives of several savings banks and municipal bond houses and municipal bond attorneys.

On May 21 State Controller Morris S. Tremaine, who presided at the conference, issued a statement urging a nation-wide drive, with the slogan, "Pay Your Taxes."

"Taxpayers," Comptroller Tremaine said, "led to believe that they were entitled to wholesale budget reductions and sharply reduced tax rates, have as a result developed an unanticipated, unreasonable and unintelligent unwillingness to pay their share of the cost of absolutely essential local government.

"This has resulted in a steadily increasing percentage of tax deliquency. This, in turn, has caused a tightening up of short-term credit, and has tended to impair the investor's confidence in municipal bonds. We therefore have another vicious circle out of which has developed a nation-wide deflationary influence of tremendous significance and serious import.

"It is agreed that preservation of municipal credit and the opening of credit channels are imperative to save the structure of local government; to protect and safeguard the property, the health and even the lives of taxpayers. It is also agreed that the great need of municipalities at this moment is the payment of taxes.

"The taxpayer must understand that taxes must be paid, and paid promptly, if municipal government is to carry on. He must also understand that taxes are a first lien on his property and that sooner or later this lien must be satisfied. The tax striker is really striking at himself by destroying the credit of his municipality, and in so doing, impairing the value of his own real estate and increasing the cost of local government.

"Temporary abnormal restrictions of credit, both short and long term, denies to cities at the very time when their revenues are abnormally depressed, a market for tax anticipation notes, welfare relief loans, refunding bonds or bonds to finance absolutely essential improvements and the upkeep of physical property.

"The taxpayer must understand how much in actual service he receives for his tax dollar as compared to the dollar he pays to the telephone, electric light, gas and similar companies. It can and should be demonstrated to him that, despite the allegations of extravagance and graft, the typical American city furnishes the most modern and efficient local governmental services in the world and that it is to his own selfish interest to see that it is preserved for the prosperous times to come.

"The way to remove extravagant or dishonest public servants from office is by resorting to the ballot and the criminal courts, not by a tax strike which will cripple the municipality's ability to operate the water plant and the public schools, and give it a black eye in the financial world for years to come."

Pumps and Their Places — Part I

By L. R. DOUGLASS
Construction Engineer, Denver, Colo.

An Outline of the Pros and Cons of Different Kinds of Pumps in the Water Works of the Average-Sized Community

A PUMP is a machine or mechanical device for taking a fluid from some given source and moving it to a new position, usually to a higher elevation or against a certain pressure. In the construction of a domestic water supply a pumping problem occurs when water cannot be obtained at an elevation sufficient either to deliver it to the distribution system at all or to deliver it to that system with an adequate and satisfactory pressure. Ordinarily the conditions of pumping may be classified as: (1) pumping direct into a reservoir or elevated tank; (2) pumping direct into the distribution system with the excess going to the reservoir or elevated tank and the deficiency coming therefrom to provide for peak demands; and (3) pumping direct into the distribution system.

The problem therefore resolves itself, basically, into the careful consideration of the type and kind of equipment necessary to provide adequate capacity, flexibility and efficiency both as to each individual piece of machinery and as to the plant as a whole; also, proper consideration of pressures to be realized, fire and standby service to be provided, hours of pumping, adaption to the source of power available, and costs of operation.

CLASSIFICATION OF PUMPS

Pumps for water-supply pumping may be divided into three distinct classifications with respect to their method of pumping. These are: (1) displacement pumps; (2) centrifugal pumps; and (3) air-lift pumps.

The Displacement Pump

A displacement pump is one in which the water is induced to flow from the source of supply through the inlet or suction pipe by a vacuum created by the withdrawal of some physical agency operating within the pump chamber. The water enters this chamber through a one-way inlet valve and is forced out through a similarly operating valve and into the discharge line by the return of the moving agency. Of the displacement pumps, the piston or plunger type is the common and well-known variety. The piston or plunger operates in a closed cylinder provided with inlet and outlet valves. The withdrawal of the piston or plunger from the cylinder creates the vacuum which draws in the water, and the return stroke forces the water from the cylinder. The operation of pumping consists of the repetition of these alternate or reciprocating strokes. Such pumps are single-acting when the piston or plunger only acts on the water, and double-acting when the cylinder is so constructed that water is discharged on both the forward and return strokes.

A piston pump is one in which the reciprocating piston is tightly fitted to a finished cylinder and operates in close contact with it. A *plunger pump* is one where the reciprocating part is a solid plunger that does not come into contact with the cylinder walls. The plunger alternately enters and withdraws from the cylinder through packing glands. The methods of packing plunger pumps divide them into the classification of inside packed, outside packed, outside center packed, and outside end packed pumps. The type of packing used is according to the head for which the pump is designed, and with consideration of accessibility and convenience.

The vertical triple expansion pumping engine is steam-operated and consists of a massive slow-speed triple-expansion engine set vertically over three single-acting pumps, both engine and pumps being built as a unit. The steam pistons are directly connected to the plungers through distance rods running from the engine crossheads to the piston heads. The steam end is equipped with Corliss or poppet valve gear. This pump is noted for its high economy, reliability, durability and flexibility over a wide range of capacity and head without serious drop in efficiency. It is usually considered to have its most satisfactory sphere of action in sizes requiring from 700 to 1,600 horsepower and corresponding capacities up to 40 million gallons daily. Auxiliaries which are necessary include a condenser, often placed in the suction line with a condensate pump driven directly by an extension of one of the plunger heads, a compressor for maintaining correct air pressures in the air chambers on the discharge and an air pump. All these may be driven directly from the plungers.

The horizontal cross-compound pumping engine consists of a high- and low-pressure steam cylinder, each end of which is placed opposite a set of pump chambers. The pumps and cylinders are rigidly connected by the two heavy frames which carry the crankshaft and flywheel. The steam pistons are connected directly to the pump plungers by means of two pairs of distance rods attached to the engine crosshead and held in line by a bored guide at the opposite end, where they are attached to the plunger by a yoke called the plunger crosshead. These pumps are of the duplex double-acting type with outside center packed plungers. The steam cylinders are usually fitted with Corliss releasing valves and eccentrics for the steam and exhaust valves of each cylinder. The condenser is usually located in the suction or discharge line. This pump has a high efficiency, is durable, and flexible over a good range of head and capacity. It is developed in sizes from 35 to 650 horsepower and capacities of from 1 to 25 million gallons per 24 hours.

All *crank and flywheel pumps* are generally steam-driven, and the power is applied through the steam piston to the water piston or plunger through the crosshead and connecting rod. The flywheel stores up energy during the first half of the stroke, replenishing it on the

second half, with the result that the steam may be used expansively. Crank and flywheel pumps are classified with respect to the power end as single or duplex according to the number of cranks. They are economical in the use of steam.

The direct-acting steam pump is a type often found and is well known for its reliability, first low cost and durability. With this pump the water end is placed directly in line with the steam end. The water piston and the steam piston are placed on the same rod, and both are operated together without any crank movement. This pump is normally found in two designs, namely, simplex and duplex, both double-acting. The simplex design has one steam piston operating one double-acting water piston, and the duplex consists of two steam pistons operating two double-acting water pistons. The steam and water cylinders are operated side by side. The principal advantage of the duplex over the simplex is its relatively continuous discharge. The stroke of one piston begins before the other piston has come completely to rest, so the movement of the suction and discharge columns is practically continuous. This type of pump is built in both horizontal and vertical units but is more often found in the former. It is suitable for capacities up to 2 mgd. Its efficiency is not as high as the other types of steam pumps which have been mentioned. It is often found in larger sizes as a triple-expansion unit with six steam cylinders arranged three on a side in tandem.

The reciprocating pump is also commonly found as a power pump, that is, connected to a driving engine such as as electric motor, steam turbine or internal-combustion engine by means of gearing, belting or shafting. Power pumps are used where it is more practical and economical to operate that type than to use a steam-driven direct-acting pump. The *reciprocating power pump* is classified according to the number of water cylinders or cranks as single, duplex or triplex. In the latter two the cylinders are operated in parallel through the medium of a crankshaft and connecting rods to the pistons or plungers. These pumps are generally back-geared through one or two reductions of gearing and may be either single-acting or double-acting. They are built in either horizontal or vertical units. The triplex pump is a popular type and one often found in small and medium-sized water works. It is usually driven by an electric motor and is rugged and dependable. It can be furnished for capacities up to 6,000,000 gallons per 24 hours where the power requirements are not in excess of 200 horsepower. The efficiency of this pump will reach 85 per cent, but considerable money must be spent for maintenance to keep it there. When driven by an electric motor, the pump is usually gear-driven and the gearing may be spur or herringbone cut, the spur gear being the usual type on the smaller units.

Deep-well reciprocating pumps consist of a plunger pump or barrel placed near or below the operating water level, pump rods and a power head mounted over the barrel. The working barrels may be single-acting, double-acting, double-stroke and triple-stroke. The single-acting fills on the down stroke and discharges on the up stroke. The double-acting cylinder fills and delivers on both the up and the down stroke and delivers a nearly continuous stream. The double- and triple-stroke cylinders deliver only on the up stroke, but give a nearly continuous stream, reducing shock to a minimum. The power head commonly operates the pump rods by a crankshaft. The stroke varies from 6 to 40 inches and the speeds range up to 40 rpm. The maximum limits are about 1,400 gpm against a head of 150 feet. Maintenance is comparatively high on this type of pump, and the working barrel must be withdrawn from the well for repairs.

The rotary pump is another type of displacement pump. It has two revolving pistons rotating in the pump case, which they completely and accurately fill. The rotation of these pistons alternately draws in and discharges the water. This type of pump has neither suction nor discharge valves and is self-priming. They are used to some extent in small water supplies and occasionally on larger ones. They give moderate efficiencies, but are not suitable for water containing suspended matter, because of wear on the close-fitting rotors.

Air chambers should be installed on all reciprocating pumps because, owing to the reversals of direction and changes in speed in the reciprocating parts, with resulting changes of pressure in the discharge or suction pipes, the pressures may be of sufficient magnitude to cause serious damage, even to bursting the pipes. This air chamber also operates to prevent the pump from losing suction. The capacity of the air chamber is based on the piston displacement of the pump. For slow-moving pumps the capacity of each air chamber should be equal to one piston displacement, and for high-speed pumps from six to eight piston displacements. They should be placed on the opposite side of the chamber from the suction or discharge pipes and in such a position that rising air will accumulate in them.

Relief valves should also be installed on all reciprocating pumps, to guard against stoppages in the discharge line and resulting damage from bursting pressures that may develop in consequence. The pressure relief valve should be connected to the discharge line.

Centrifugal or Impeller Pumps

A *centrifugal pump* is one which raises the water or other liquid by a wheel, called an impeller, which revolves in a tight casing. The water enters the pump at the center of the impeller or eye and is thrown against the periphery or outside of the impeller by the unbalanced centrifugal force and enters the discharge pipe under pressure. The pressure head in the discharge pipe is created from the velocity head imparted to the water by the revolution of the impeller. The centrifugal pump occupies an extended field of usefulness, and it is perhaps safe to say that it is probably the best and most used type of pump for water-works service. They may be obtained commercially for any capacity that might normally be required and for heads up to 1,500 feet with efficiencies up to 80 per cent or even greater, depending on the speed, head and capacity.

Correct speeds are very essential for the proper operation of a centrifugal pump, especially where the pump is direct-connected to the prime mover. They may be driven by electric motors, steam turbines or gas engines, and are ordinarily direct-connected through a flexible coupling to the electric motor or gas engine. Where steam turbines are the motive power, reduction gearing and rigid couplings are generally used. They may be operated by belt or similar drives, but higher over-all efficiency is normally obtained by direct connection.

Centrifugal pumps are classed as *volute or turbine pumps*. The volute is one in which the channel or casing into which the water flows after leaving the impeller has a volute or spiral shape of such proportions that the velocity of flow is the same at all points in the channel. The turbine pump is one in which the channel or casing has the same cross-sectional area throughout. The velocity of the water leaving the impeller blades is changed in direction, and the velocity head is changed to pressure head by means of diffusion vanes surrounding the impeller. Volute pumps are lower in first cost than turbine pumps and are more suitable for the handling of liquids containing grit or suspended matter in large quantities. While higher efficiencies can be obtained with turbine type pumps, their greater cost and greater wear on the diffusion vanes are diminishing their general use in water-works service.

Centrifugal pumps are also classed as *single-stage*, *two-stage*, up to *multiple-stage*, the number of stages being determined by the pressure to be developed. The discharge from one impeller leads to the suction of the other, and the pressure or head is progressively built up to the required point.

The parts of a centrifugal pump in contact with the water should be of bronze or gun metal, and it is especially important that the impeller should be of bronze in order to resist corrosion. The impeller should also be machined and polished to minimize friction, and the side of the impeller should be enclosed so as to prevent friction between the moving water and the casing. The impeller should also be balanced both statically and when in rotation. An unbalanced impeller causes heating of, and undue wear on, the bearings, vibration and noise, and sometimes the failure of the pump. The interior shaft bearings should be of hard bronze.

The casings of all but the smallest pumps are usually split horizontally so that the top part may be readily removed to permit inspection and repairs. Thrust bearings or thrust balancing devices are used to take up end thrust and the pumps are designed with double suction, opposed impellers and other schemes to overcome end thrust. These expedients are not entirely successful, however, and end thrust will occur and must be cared for.

The outstanding advantages of centrifugal pumps are: low first cost; only one moving part; simple operation and repair; smallness of the unit relative to capacity; dependability of service; safety because of no increase of pressure due to stoppage of delivery; and an even, continuous flow. The principal disadvantages are the fact that they cannot be regulated for a wide range of flow, the difficulties of priming unless operating under a positive suction head, and the fact that direct connection cannot be made to low-speed engines. The usual speeds of centrifugal pumps are 900 to 1,200 rpm and 1,759 to 1,800 rpm, and often as high as 3,500 rpm.

There are two types of impellers, namely, open and closed. The open impeller consists of radial vanes on a central hub and a disc open at the sides. The closed impeller has the vanes formed between two circular disks which form closed passages between the vanes and extend from the inlet opening to the outer periphery of the impeller. The closed impeller is the more efficient and generally used. The open impeller is particularly adapted to handling water with sand, grit and other foreign matter.

The cost of centrifugal pumps varies with the head, speed, number of stages, type, and, of course, market conditions. Ordinarily, the first cost of a centrifugal pump is less than the first cost of other types of the same capacity. In figuring the relative economy on the basis of capitalized cost, the smaller space necessary to be provided for the centrifugal pump should be taken into account.

Centrifugal Well Pumps

The centrifugal pump for well pumping is essentially a multi-stage turbine pump with the several impellers on a vertical shaft. The deeper the well, the greater the number of impellers required. This shaft is usually direct-connected through a flexible coupling to an electrical motor built into and mounted directly on the discharge elbow. It may be driven by a belt from motors or other engines. The driving head or housing containing the motor or drive pulley in case of the belt-driven type also supports the discharge pipe and attached pump casing and carries the thrust bearing from which the shaft and impellers are suspended. This head must carry not only the weight of the impellers and drive shaft but the weight of the water column as well. The base should be well constructed and so designed that motors of different powers may be installed to meet changing conditions of head, an event which occurs not infrequently.

Where the drive shaft is encased, separate oil pipes are used for lubricating the bearings. These pipes are usually of double-strength copper-bearing steel. Where this type of lubrication is used, some method must be provided that will return the lubricant within the shaft casing without fouling the water. Where the shaft is not enclosed and operates in water, it should be of stainless steel, and lignum vitae bearings should be used. The discharge pipe and shaft are made up in lengths varying from 7 to 20 feet. The separate lengths are usually connected by flanges welded or threaded to the barrel.

The capacity of this type of pump varies from 200 gpm from a 6-inch well to approximately 3,500 gpm from a 24-inch well. It is practicable to develop these quantities from any depth ordinarily encountered, since it is only necessary to provide a sufficient number of stages to overcome the head pumped against. The necessary stages may be all in the well, but against very high heads it is probably better to place the boosting stages at the surface.

The best efficiency of this type of pump is approximately 60 to 65 per cent for the pump proper and about 50 to 55 per cent over-all efficiency with the motor drive. This type of pump will give satisfactory service and requires comparatively little maintenance. For satisfactory operation it is essential that the well alignment be perfect in order to prevent destructive wear on the bearings. The impellers should have wide water-sealing faces, otherwise erosion from grit and suspended matter in the water will soon reduce efficiencies and generally impair the service of the pump.

(*To be continued in the July issue*)

A Thought for Summer Vacations—

The Only Place Where a Fly Has Any Value
Is On the End of a Fish Line.

—New Haven Department of Health.

A Study of the Water Supply of Staunton, Va.

By RICHARD H. CATLETT

THE water-supply chronology of Staunton, Va., may be divided roughly into four periods. First, the period of springs and wells, which extended from the founding of the town in 1748 until 1853. Staunton is built in a limestone section full of bold springs of clear, cold water, and it was no doubt these springs which induced the first settlers to make their homes at this place. For a hundred years there was no municipal water supply although the town undertook the care of a number of wells and pumps located at important intersections during the latter half of this period. The town pumps, through public sentiment or habit, continued in use long after spring water was furnished in abundance, and as late as 1880 it was not an uncommon sight to see a surrey stop at one of the pumps while a negro loafer, in the hope of a few pennies, would fill the iron dipper and pass it in turn to the members of the family of some local plutocrat.

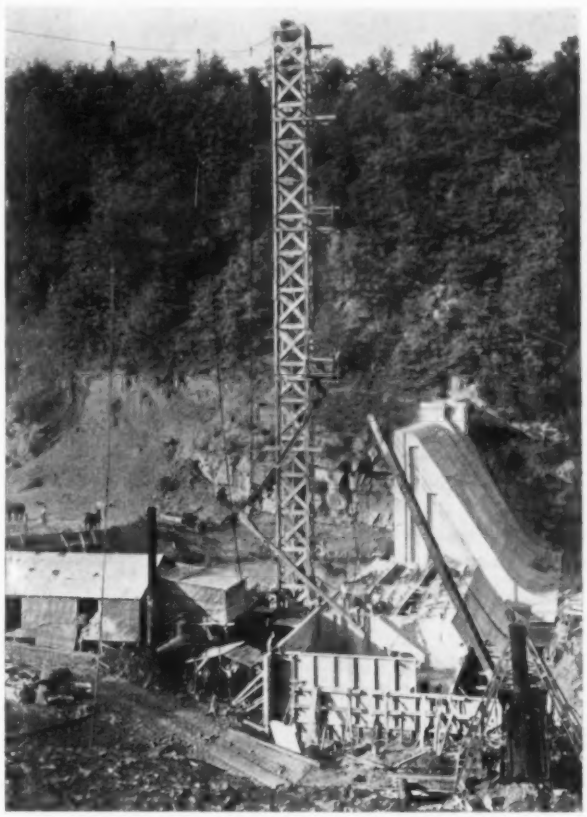
In 1853, Staunton had grown to about 3,000 inhabitants and all the low lands had been fairly thickly settled. It became increasingly important to obtain a water supply which would give some measure of fire protection in the town, and with this primary object a pipe line was laid from Buttermilk Springs, 2½ miles southwest of Staunton, to serve mains laid throughout the lower sections. Thus the first municipal water service begins the second period. The mains which were laid at that time, or many of them, are still in service. There were very few domestic services to take water from this new municipal supply, but public hydrants began to displace the town pumps, and in a few notable instances the wealthier citizens installed bath equipment.

By 1870 the population of Staunton had doubled and the Buttermilk Springs supply was deficient for the 6,000 people who were being crowded up to the higher ground. In 1873 it was decided to construct a reservoir of 2½ million gallons capacity on top of what was then known as Capitol Hill and to feed this reservoir by pumps from the flow of a number of springs closely adjacent to the city. A report dated September 20, 1872, gives the flow of these springs as 2½ million gallons in 24 hours. In times of excessive drought, however, the springs produced less than ½-million gallons per day.

The water from the Gypsy Hill springs served the city until its third water period, 1876 to 1926, and it is still maintained as an auxiliary supply. This water is clear and cold, but very hard. Its total of dissolved solids is 332 ppm and its total hardness 278 ppm. A water of such character is entirely unsuited for industrial use without extensive chemical treatment, and it filled domestic hot water installations with almost unbelievably heavy deposits of limestone.

Agitation for an Improved Water Supply

Toward the end of the last century there was agitation for an additional water supply, because during periods of drought the supply from the springs was already found insufficient. Shortly after 1900, as a result of engineering reports made to the council, water rights were acquired in the Blue Ridge Mountains about 15 miles southeast of Staunton. The project was not pursued, however, and not until 1923 was definite action taken on this increasingly acute problem. It was finally decided to build a storage dam on the North River, fifteen miles northwest of Staunton in the Shenandoah National Forest area. The considerations which led the consulting engineers to recommend this supply were:



A CONSTRUCTION VIEW OF THE DAM, TAKEN IN AUGUST, 1925, WHICH SHOWS THE SECTION

1. A sufficient supply for the estimated needs of the city until 1955.

2. Additional supply could easily be developed for three times the 1955 requirements.

3. A clear, tasteless, colorless, very soft water could be secured with a total hardness of less than 10 ppm.

4. It would supply a gravity flow to Staunton.

5. It was located within Government control and a practically uninhabited watershed of 27 square miles.

6. The economy of operating costs as compared with a suggested supply nearer at hand which would require chemical treatment and filtration, although this nearby supply could be obtained at approximately half the first cost of the North River project.

The estimated cost of the North River development was $700,000. After a short campaign of public education the citizens of Staunton, by a vote of more than 3 to 1,

authorized a bond issue for this amount. The project consisted of four main contracts:

1. A 125-million-gallon storage dam
2. A 5,600-foot tunnel through Lookout Mountain
3. A 15-mile pipe line to the city
4. A distribution reservoir and aeration basin near the city

The Dam and Pipe Line

The new water-supply dam is of the gravity type of solid concrete masonry, 40 feet high, 388 feet wide at the crest, with a 220-foot spillway. The aggregates were produced at the site by crushing the local sandstone. Approximately 9,000 cubic yards of concrete were used in the construction of the dam and gatehouses. At the north end of the dam is a 36-inch blow-off valve, and at the south end is the intake chamber fed by four 12-inch intake valves spaced at 10-foot intervals. From the intake chamber a 24-inch sluice-gate leads to the pipe line. Immediately below the dam is the lime treatment plant and settling basin, which was not a part of the original contract and which will be discussed later.

The pipe line from the dam through the tunnel is of 20-inch Class A cast iron. The tunnel portal is ½-mile below the dam, making a total of 1½ miles of 20-inch line. From the south portal of the tunnel to Staunton, a distance of 14 miles, is a 16-inch line of classes A to D cast iron pipe. All joints are made with Leadite.

The Distribution Reservoir

An aeration basin and distribution reservoir of 2¾ million gallons capacity were constructed at Two Mile Hill just west of Staunton at an elevation of about 40 feet above that of the Madison Street reservoir, which was constructed in 1876 and is still used for direct distribution to the city.

The only real construction difficulty was encountered at Two Mile Hill. When the reservoir was first built for testing, several of the concrete slabs on the bottom on the excavation side of the basin collapsed and the water was quickly lost through underground channels without giving any evidence of flow at the surface. An inspection of the bottom under these slabs showed that a number of channels were leading to fissures in the rock. It was necessary to plug the fissures with concrete before reshaping this part of the reservoir, causing a delay of about six months in getting this part of the new supply into operation.

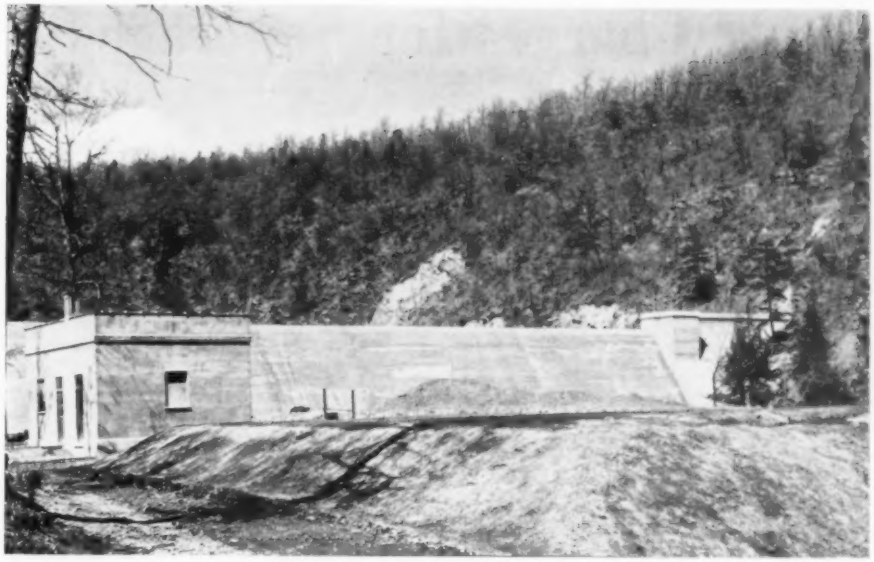
A Comparison of Costs

A comparison of the estimated costs and the actual costs of the various parts of the new supply is of interest. Using only even thousands, the dam, spillway and gatehouse were estimated at $67,000, while the actual cost was $148,000. The estimate for the tunnel was $90,000 and its cost $174,000. The laying of the pipe line was estimated at $105,000 and cost $107,000. The cast iron pipe, including specials, was estimated at $328,000 and was bought by the city for $270,000, a saving of $58,000. The distribution reservoir was estimated at $40,000 and cost $39,000. The total project, which was originally estimated at $700,000, cost the city $814,000 before the cost of repairs to the Two Mile Hill reservoir.

Red Water Replaces Hard Water

For the first year of operation of the new soft-water supply everything went well, but after the first year troubles began. Boiler scale and chapped hands had been eliminated, but in exchange red water and rust-clogged pipes appeared. The correction of this trouble was accomplished in a simple and satisfactory manner by the installation of a lime treatment plant at the dam. The raw water shows a pH reading as low as 6.5. Lime is added to bring this reading to above 10 at the dam and 9.6 at the city. Test sections of various kinds of pipe have been in service since the lime treatment was begun in 1929, and it is believed that corrosion has been arrested. This treatment, however, does not remove corrosion, and

THE NORTH RIVER DAM AND RESERVOIR OF THE STAUNTON, VA., WATER WORKS, WITH THE OPERATOR'S HOUSE SHOWN IN THE INSET



THE WATER TREATMENT PLANT OF THE NORTH RIVER WORKS, STAUNTON, WITH THE TWO 30 x 60-FOOT SEDIMENTATION BASINS IN THE FOREGROUND

all services and domestic piping which were corroded during the period before treatment have been, or will have to be, removed.

Chlorination

Chlorine is added at two points. At the dam approximately 3.5 pounds per day is used to bring the residual chlorine to 0.3 ppm, the demand being quite regular at close to 1,200,000 gallons per day. At the Two Mile Hill reservoir the residual chlorine had practically disappeared, and further treatment is given to bring this figure back to 0.3 ppm. There have been very few complaints from water users as to excessive chlorination.

Services and Metering

With the exception of municipal services which take water from the fire hydrants, the consumption is 100 per cent metered. In addition, careful estimates are made of all unmetered uses, which, except in the case of a large fire, form a very small percentage of the whole consumption. Of the 2,780 meters in service, more than 2,600 are $\frac{5}{8}$-inch meters. The city has standardized on meters of the highest quality in preference to lower-priced but shorter-lived instruments, and two makes are approved. All meters are read monthly, although billings up to the present time have been quarterly. A new ordinance will shortly change this to monthly billings, a much less burdensome system for the consumer, and one which will assist in the effort to eliminate the old idea of a water bill as a tax.

All new services are copper, and whenever a main is renewed, new services are installed. The smallest main now being installed is 6-inch Class C cast iron. There are a few exceptions to this rule, but only in furnishing service in sparsely settled sections where there is no prospect of early growth of demand. In such cases 2-inch mains are used.

Loss of Water

Approximately 1,250,000 gallons of water are being delivered to the reservoir each day. This is the figure for present consumption which was used by the engineers who predicted the demand for double this amount by 1955, and the system was designed to furnish $2\frac{1}{2}$ million gallons. Twice since August, 1926, when the new system began to operate, the city has suffered from water shortage which required emergency measures for considerable periods of time. Presumably the city had a safety factor of two, and yet twice in six years it suffered from lack of water. It would be an expensive proposition to double the capacity of the dam, and this cost would be considerably more than it would have cost for adequate storage in the first place.

The city should be able to materially increase its supply in another way. Many of the old mains, some of them eighty years in service, are still doing duty. A total of $1\frac{1}{4}$ million gallons of water is being delivered per day to the distribution reservoir, but only 50 to 55 per cent of this is accounted for by the meters and carefully estimated usage through the fire hydrants. Adding to the consumption thus accounted for, an allowance of 10 per cent for under-registration of meters, and an allowable leakage of 3,000 gallons per mile of main per day, for the 35 miles of mains, there would still be 35 per cent of the water completely unaccounted for. In all probability the greatest part of this loss is from the very old mains, all of which are in the lower levels where pressure is greatest. Where sections of old main have been taken up, there have frequently been found such things as wooden plugs which lack permanence. If a pitometer survey of the mains were made, it is estimated that it would locate 60 per cent of this excessive leakage, and would immediately increase the mountain storage from 100 days' supply to 125 days' supply, the equivalent in effect of about $3\frac{1}{2}$ feet increase in the height of the dam.

ACKNOWLEDGMENT.—From a paper delivered before the Virginia Water and Sewage Works Association.

Good Men; Bad Machinery

COUNTY government is on the whole in the hands of men of integrity and competence who labor in a morass of legal and political restrictions that discourage or forbid the application of well-established devices of efficiency and economy.

JOHN F. SLY,
Director, Bureau for Government Research, West Virginia University.

What Charges for Sewerage Service?

A Topic of Great Interest to Taxpayers

THERE are several ways to determine the basis of charges for sewerage service. The first, which is the most equitable, is to bill for the amount of sewage contributed. Because of the small sizes of the services to the individual houses and the amount of solids contained in this sewage, it has not been practical to meter the connections, but with the exception of certain industrial establishments in which water enters into the creation of the products, the use of a meter on the water service has been found to be a good indication of the relative amount of sewage produced.

The second method, that of charging upon a schedule of prices for fixtures connected with the sewer line, is of value when the water service is not metered, and when the water utility is owned by a private corporation.

In the establishment of the rates to be charged, much study must be given to the various items which enter into the annual costs. In the construction of a system of sewers, the costs of the main or intercepting sewers cannot be charged against the properties through which they flow, since the entire theory of sewer construction is on the basis of eventual benefit to the property assessed, and therefore the amount which can be assessed must be based upon the cost of a sewer of sufficient size to serve only the property in question. The excess cost is an item which must be carried by the entire community and is usually provided for by the issuance of long-term sewer bonds.

Although the cost of branch service sewers constructed in public roads can be assessed directly against the abutting property, provision must be made for corner properties abutting on two or more sewers, and for the length of sewer included in the intersection of street lines, as well as for property which, by reason of topographical features, is unable to use the sewer. These charges are likewise included in the bond issue.

In addition to the sinking-fund and interest on the bonds, other annual costs include the cost of operation and superintendence of the pumping stations or disposal plants, the cost of superintendence and operation of the sewer system covering a periodical flushing of the system if the pipes are small and the flows so small that deposits are inclined to lie in the sewer.

Another item which enters into the calculation in many communities is the charge of the use of sewers in adjoining municipalities, and in some cases, when many political bodies use a joint disposal plant, the share of the cost of disposal must also be taken into consideration. After the total annual cost has been found, there still remains the task of dividing the cost among the various users of the sewer, which is difficult, to say the least.

Bases for Charges Now in Existence

In a study of charges for sewerage service, the New York State Bureau of Municipal Information has compiled the following summary of the schemes now in existence to determine the rate of sewerage service.

1. A graduated scale rate is fixed, depending upon the quantity of water consumed. If no water meter is available, or the property owner has a private supply, then an approximate estimate is made. A minimum charge is usually made in instances where the rentals are thus determined.

2. A uniform rate, based upon the water consumption, may be charged for all types of consumers.

3. A charge equivalent to a certain percentage of the water bill may be made. This may be collected separately or added directly to the water bill.

4. A combination of a "ready-to-serve" fee and the method resorted to in (1) may be made. The "ready-to-serve" fee may be graded according to the number of fixtures, the size of the meters, the number of persons served, or the type of property served. This fee is justifiable in that it represents the charge for the general benefits received. It can be likened to the meter service charge levied by water departments. The charge is collected from every owner whose property is connected to the sewer line, whether sewerage is being discharged or not.

In those localities where meters are not generally used or where the water consumption is paid on a flat-rate basis, the following methods may be resorted to.

5. A flat rate per house connection may be charged according to a suitable classification of the property.

6. A scale of rates may be determined which are based upon the number of fixtures connected to the sewer system.

7. A combination of a flat rate and a fixture rate may be established.

In municipalities containing a large number of diversified industries the following methods may be resorted to:

8. The rates may be based upon the number of persons employed or served.

9. The rate may be based not only upon the quantity of sewage contributed, but also upon the quality. The concentration of the sewage can be determined by the biochemical oxygen demand test.

10. A rate may be determined by the measured quantity of sewage contributed. Individual meters or weirs would have to be installed in this case.

In determining the costs of sewerage service, some measure of the service should be agreed upon by the municipality and the property owner thus served. The general features of sewerage service demand that the sanitary system shall have sufficient capacity to carry off the sewage, and that the effluent shall not cause a nuisance when turned into a stream or river. Likewise, the storm sewers should be of adequate size to immediately carry off the normal run-off reaching the inlets.

One difficulty encountered by city officials in this effort to provide increased sewerage service is the fact that sewer pipes are invisible and under the ground, and the sewage disposal plant is considered an unsightly object,

to be shunned and kept as far from residential sections as possible. This attitude toward the sewerage system which is forced on city officials acts to the detriment of proper sewage treatment provision and proper sewage collection facilities. Paving, street lighting, public buildings, etc., usually represent more popular investments for public money, because they provide objects which can be seen each day and, being seen, can be appreciated. Unfortunately, too, the sewer department of the city administration does not always attract the highest-priced or most able men. When lay-offs occur or when serious curtailment of the city budget is contemplated, the sewage plant operation and sewer maintenance is usually one of the first departments to feel the cut.

Service Charges Eliminate Many Evils

If the town grows and outstrips the capacity of the sewer mains, and the additional connected population overtaxes the treatment facilities of the disposal plant, there is always the difficulty of securing funds for needed enlargements. This is due, it is believed, in large measure to the way in which sewer systems are currently financed. If proper sewer charges were levied on users of the sewer system, this evil would be eliminated. These charges should be commensurate with the service rendered and in proportion to the investment. They should provide sufficient funds for (1) proper maintenance of the collecting system; (2) adequate treatment of the sewage at the disposal plant; (3) a sinking-fund to discharge the interest and bonded indebtedness; (4) necessary line and plant expansion as the connected population increases; (5) providing against depreciation and obsolescence of the treatment plant units.

By making the sewer system independent and self-sustaining in this manner, it is taken out of the step-child class. In setting up sewer rates, thought should be given to the original plant investment and the operation cost. It is obvious that sewer systems differ in cost, depending on soil conditions, whether or not pumping is necessary, the cost of the plant, site, etc. These costs necessarily influence the rate which is supposed to represent a fair return on the investment. Therefore, it is not fair to compare the rates charged in the various cities without considering the various factors which influence those rates.

Objections to Sewerage Service Charges

While there are many advantages in charging for sewerage service, some objections to this type of revenue for the construction and maintenance of a sewerage system and sewage treatment plant have been suggested. An objection has been raised to the fact that the billing and collection of rental or service charges requires clerical assistance and involves expense and other complications of administration. Some property owners may prefer to pay one bill for taxes rather than to have a separate bill for sewerage service. The billing of charges for service as well as for the cost of the connection may cause some property owners to delay making a sewer connection until forced to do so by ordinance.

Service charges cannot be billed until sewer connections are made, and any unforeseen delay in construction may delay the receipt of funds, thereby throwing an unexpected burden on other sources of revenue. This would apply particularly to the first year or two after starting to build the system.

A residential community does not require the various classifications of service found in an industrial city, and therefore the complications of a rental system may not appear to be justified.

It may be claimed that the municipality as a whole should bear a substantial part of the burden. In Massachusetts, the municipality as a unit must pay at least one-fourth of the total cost of construction.

Advantages of the Service Charge Plan

Any equitable plan by which funds can be obtained continuously for sewerage operation and maintenance without depending upon appropriations from the tax levy has distinct advantages. Funds can be provided continuously and adequately to ensure efficient operation and the best service. The source of revenue will not be in direct competition with other more popular budget items in the tax levy. The funds will not be subject to economy cuts at the whims of officials.

Each property owner will pay only his fair share of the cost in accordance with his use of the system. Taxpayers having no sewerage facilities will not be required to pay for maintaining the service rendered to others. The sewerage system, and especially the sewage treatment plant, if any, can be maintained in efficient condition and thereby avoid waste of public property.

The danger of lawsuits because of pollution from the discharge of untreated sewage or other nuisance will be avoided if the sewage treatment plant can be kept in good condition, by proper and continuous financing. The availability of funds will permit engaging trained operators and adequate labor and will make possible the operation of the sewerage system as a self-supporting public utility comparable with the water-supply system.

The funds can be limited in use to the purposes intended, which, as the New York State law puts it, are "the payment of the cost of the management, maintenance, operation and repair of the sewerage system, including treatment and disposal works." While there may be ample justification in theory for obtaining funds from the tax levy for these purposes, the facts remain that many sewerage systems have suffered seriously and sewage treatment plants have been ruined for lack of funds, whereas these troubles have been avoided if an annual service charge plan had been in operation.

THE MENACE THAT EXISTS IN OUTWORN DWELLINGS

IN his foreword to the recently published health survey of the boroughs of the Bronx, Queens and Richmond, Health Commissioner Shirley W. Wynne of New York City says:

"The findings of this study are evidence once more of the menace to public health of outworn dwellings in the older sections of the city, which should, if for no other reason than for the protection of life, be replaced by new housing as a first order of business for the health and welfare of the city. In general, the more favorable conditions exist in sections of the city which are newly built up. In each of the boroughs tuberculosis and infant mortality are particularly high in the older areas—in the so-called slum sections where bad housing, with its implication of inadequacies of initiative economic efficiency and stability of character creates the inevitable vicious circle."

FORWARD STEPS

Reported by
Municipal Officials, Chamber of Commerce Executives, and Others

Unemployed Build Two Roadways in New Orleans City Park Extension

NEW ORLEANS, LA.—In May, 1932, the taxpayers of the city of New Orleans approved a $750,000 bond issue to provide work for the unemployed. A program of public improvements was formulated, one of which is the improvement in City Park Extension.

The City Park Extension consists of a large tract of land of approximately 927 acres, rectangular in shape, lying immediately north of the present City Park area. It is bounded on the east by Bayou St. John, whose easy and graceful meanderings lead to and empty into Lake Pontchartrain. On the north is Robert E. Lee Boulevard. A short distance away is Lake Pontchartrain, the shores of which are well outlined and protected by a mighty concrete seawall. On the west side is the Orleans Avenue Canal. The area was once thickly wooded with the famous Louisiana red cypress trees, some of which were five or six feet in diameter.

Work on the improvement began in June, 1932, and consisted of the construction of two roadways running almost due north and south. One parallels Bayou St. John on the east, meandering in conformity with the bayou at an approximate distance of 200 feet from it. The other roadway parallels the Orleans Avenue Canal.

Rights-of-way for each roadway, 130 feet wide, were cleared of all trees and underbrush. A 60-foot strip of each right-of-way was well grubbed of stumps to a depth of about two feet below the natural surface, as a bed for the roadway proper. All this clearing and grubbing was performed by unemployed labor with ordinary clearing knives, cross-cut saws, shovels and axes. Many of the workers had never used these tools before, for a great many of them had been clerks, bookkeepers, office men, etc. The work progressed throughout the long, hot summer months, but the workers endured, wondering if they would ever become accustomed to this type of hard work.

When the construction had progressed enough to warrant it, the city let a contract for excavating a borrow-pit, using steam shovels, and building an embankment for the roadway in the right-of-way cleared and grubbed by the unemployed. The embankment averages 2 to 3 feet in height and has a 36-foot crown, with the necessary slope distance for a 1½ to 1 slope. The borrow-pit averages about 30 to 35 feet wide by 5 feet deep and runs parallel to the roadway with a 20-foot berm intervening. The contract work has been completed, and accepted by the city.

The unemployed are now engaged in shaping and grading the embankment and ditching the side ditches. The grading includes crowning and building the shoulders to receive the surfacing material. Each roadway is approximately 9,000 feet in length, making a total of 18,000 feet. This work is now almost 90 per cent complete. The city expects to furnish and haul the surfacing material of shells. The spreading and final grading will, however, be done by the unemployed in order to furnish the maximum amount of work.

THOS. B. BECNEL,
Assistant Engineer, Department of Public Property.

A Dump That Pays a Dividend

SPRINGFIELD, MASS.—For years the Department of Streets and Engineering of Springfield had filled in locations for private property owners, thus improving the property and using a fraction of the ashes and waste collected by the Waste Disposal Department. When, in 1930, a new dump was to be acquired, the Superintendent of Streets and Engineering asked, "Why not buy property that needs filling in to make it of future value? Something located so that it will become a part of the city as it expands, and thus effect an improvement for the city, as we have been doing for private property." This suggestion was approved.

A 23.8-acre tract of underbrush, knoll and swamp was found just off the Boston Post Road, about three miles from the center of the city, which cost about $5,000. Several old woods roads on private holdings were granted by the owners as right-of-way, and tractors were set to work making these overgrown paths operable for men and machines. Construction gangs made hard-surfaced streets such as are found all over the city.

In the course of excavating, several surprises came that brought the purchase into the realm of high finance. A 30-foot bank of filling-in dirt was uncovered —something that the Street Department had to buy regularly. Next, beds of peat moss, 25 feet deep, came to light; this was ready money, and there was an immediate sale of all the city felt it could let go, to florists, gardeners, parks, private estates and golf courses, and the city kept all it will need for years for its own parks.

Most thrilling of all, however, was the discovery, in the dump, of several 30-foot banks of sand. By the fall of 1932 the city had taken out and used materials estimated to be worth from $25,000 to $30,000, which it would otherwise have had to buy: about 15,000 tons of sand; from 8,000 to 9,000 cubic yards of peat moss; more than 200 cords of wood; 25,000 cubic yards of filling, etc. Besides, there is all the sand needed for the concrete fence posts and roadside guards, which the Street Department makes right at the dump in its concrete plant. The profit on this $5,000 purchase has already been high, and there is a supply that will last for years. The Street Department maintains several shops at the dump—carpenter, iron-working, electrical, and concrete manufacturing—where all manner of salvaged material is made of use.

This 23.8-acre dump section will eventually all be filled in and will be

PART OF THE CITY DUMP SECTION IN SPRINGFIELD, MASS., WHICH IN TIME WILL BE A PARK

The street construction and landscaping have been done by welfare men working for the Department of Streets and Engineering

landscaped into a park, which the city will have ready for use when it needs it, and the value of this undertaking will then be apparent to all.

S. M. NEAL

Land Occupancy and Real Estate Valuation Trends Studied

PROVIDENCE, R. I.—Among the projects proposed by the City Plan Commission for the future development of Providence is a plan for the revamping of certain blighted districts bordering on the waterfronts near the civic center, including the erection of a new bridge and a dam. In order to plan intelligently for this new development, it became necessary to make a detailed study of the districts for the purpose of determining the trend of land occupancy, population, and real estate valuations.

Thus the Providence Survey becomes a comprehensive industrial, commercial, residential and realty survey of the city, a study of the tax valuation and the trends of assessed valuation as well as the shift in the expansion of industry and commerce.

The work, which is under the direction of Frederick L. Ackerman, of New York, and the completion of which will require several months, is being carried on largely with labor provided by the City Aid Department. It will undoubtedly provide the most complete study ever made of the city of Providence.

The general information concerning each structure will include assessor's plat number, block, lot and street number, use district, height and area, assessed valuation of land, building and total valuation, land price per square foot as of 1910, 1920, 1930 and 1932.

Detailed information will be provided on the basis of various classifications such as residential, commercial, light and heavy manufacturing, transportation, terminals, institutional, and unclassified. Residential information will include such data as private homes, apartments, hotels, tenements, boarding houses, number of families occupying the building, number of rooms and number of occupants, and original occupancy. The commercial information will include nature of the business, number of stores and number of employees.

As the information is gathered, it is being plotted on plat maps, and when it is complete a card index will be prepared which will enable any department of the city desiring information secured in the survey to locate the particular data desired. The index cards themselves will carry, in highly condensed form, as much information as can be recorded on them.

JOHN H. CADY,
Chairman, City Plan Commission.

McKeesport Utilizes the Depression to Plan for the Future

MCKEESPORT, PA.—In common with practically all other cities, McKeesport has been faced with the necessity of materially reducing governmental expenditures during the past few years. In this program, the city engineering department was particularly affected. The ordinary routine duties of normal times, such as street improvements, water and sewerage extensions and other similar projects, have been reduced almost to nil. As a result, including time and salaries, the appropriation of the Engineering Bureau was reduced by more than half. However, this has not dampened efforts to provide needed municipal services wherever practical. For one thing, it seems wise to take advantage of the times by doing some good city planning during the depression. This policy is being followed.

One of the city's outstanding citizens, H. H. Renziehausen, donated a large tract of land and a sum of money for a municipal park. The engineering department under the writer's direction prepared surveys and a design of this property. During the past two winters, work in the development of the park has been given to the unemployed. Grading, drainage, the construction of driveways and pathways and many other improvements have been made. More than 700 trees were set out last year.

At present the city is preparing a comprehensive zoning plan and ordinance. This project had been discussed for many, but until a few months ago no definite steps had been taken toward its accomplishment. Progress is now being made by reason of arrangements to have the engineering department collect and prepare the necessary basic data under the advice and supervision of James H. Allen, of Pittsburgh, city planning consultant formerly associated with Morris Knowles, Inc. Upon completion of this part of the work, Mr. Allen will develop the plan in final form.

The advantage of carrying out planning work at this time under such advice as McKeesport has secured is apparent. The broad experience and direction of an expert are utilized where such services are most essential, and at the same time the conduct of details by existing municipal forces is provided for. A considerable economy is thereby effected.

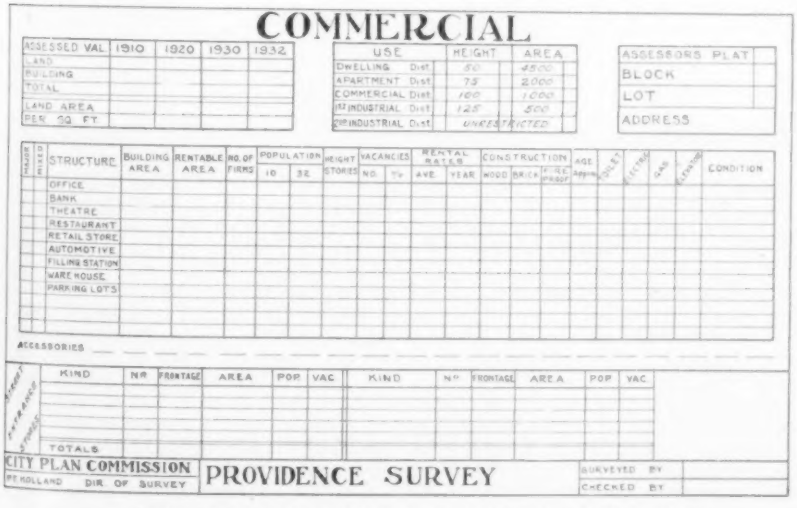
L. F. SAVAGE,
City Engineer.

A Parking Charge to Finance Beach Protection

SAVANNAH BEACH, TYBEE ISLAND, GA.—The financing of beach protection structures by an automobile parking charge has developed over a period of about six years at Savannah Beach. When the beach began to be eroded at a point where without special protection works the sea could rapidly cut through to the lagoon and separate the beach from the highway, the usual ways of financing such works failed to produce the necessary funds. The owners of the lots which were being lost saw no hope of saving their property and would not or could not pay for the protection works. The other property was already taxed as much as could be considered fair.

The merchants of Savannah came to the rescue. Donations were asked for and received; most of the merchants contributed about $25 each. These funds were used to build jetties and other protection works. A small ticket office was built at the town limit, and each car that drove onto the island was asked to contribute $1. This was voluntary, and most of the people who enjoyed the beach were good sports enough to give the dollar, though of course quite a number evaded paying.

In 1929 the town changed its name from Tybee to Savannah Beach. In the original act providing for the charter a strip of land, between the mean low water mark and the property line, known as the strand, 150 feet wide running the full length of beach, was dedicated to the city. The city was authorized to put structures on the strand and protect it. A special act secured from the General Assembly in August, 1931, gave authority to charge for the use of the strand between 14th and 18th streets.



INDEX CARD FOR RECORDING INFORMATION GATHERED IN IN THE COMPREHENSIVE SURVEY OF PROVIDENCE, R. I.

With this act as a basis for finance, the town proceeded to bulkhead quite a section of the strand, to level the sand dunes behind the bulkhead, pave the fill with oyster shell and tar, and construct boardwalks onto the bulkhead, which proved quite an added convenience for the thousands of promenaders using them, as well as improving the appearance of the bulkhead and the parking areas. This provides parking space for a great many cars right on the shore and adjacent to the dance and bathing pavilions. The streets into and out of the parking area are one-way, and officers are stationed there to regulate traffic and take up parking tickets. These tickets are sold at the ticket office at the bridge to the island, and also by the ticket collectors at the parking areas. The charge is 25 cents and is collected from every car that drives into the parking area.

In 1932 the town received about $11,000 from this source, enough to make interest and principal payments on the money borrowed to build the protection works and the boardwalks which have been built along the top of the bulkheads. It will be possible within the next few years to do some needed paving, extend bulkheading and jetties, and do this without increasing realty taxes.

OCEAN PARKWAY, SAVANNAH BEACH, GEORGIA

The beach protection works completed so far have been creosoted timber. When the erosion first became severe, brush jetties were tried without success. In 1931 Fort Screven built some steel sheet pile jetties which assisted the town materially. It is hoped that future works will be more sightly and durable, probably of concrete.

HENRY M. BUCKLEY,
Town Clerk, Savannah Beach, Tybee Island, Ga.

Items of Progress Towards Sound Tax Methods

By MABEL L. WALKER
Executive Secretary, General Welfare Tax League

Sales Tax Laws Declared Unconstitutional

BOTH Illinois and Arizona have had their newly enacted sales tax laws declared unconstitutional by the respective state Supreme Courts. The Illinois law was voided on the grounds of non-uniformity in application to the class on which it operated. The specific points on which the bill was killed were the exemption of "farm produce sold by the producer thereof" and automobile gasoline. The exemption of gasoline was considered a particular violation of the constitutional provision for uniform requirements because the business "indubitably belonged" to the category taxed. The law was also held illegal because of an appropriation set up for a dual purpose, since it attempted to appropriate for unemployment relief and for schools. It is not clear whether taxes already paid by retail buyers in the preceding forty days will have to be refunded.

The adverse decision with respect to the Arizona law was based on entirely different grounds. Under the Arizona constitution a bill passed as an emergency measure is not subject to referendum, but such acts must be passed by at least a two-thirds vote of both houses. The original act was passed in this way, but it was amended in both houses, and the final conference report passed by a majority, but not a two-thirds, vote. Suit against its constitutionality was brought on this ground.

Public opposition to the Governor for signing the sales tax bill became so great that there was much talk of a petition for his recall. This talk has largely died down since the law has been declared unconstitutional. A new session of the Legislature, however, will be called, to pass another sales tax bill.

Michigan Limit Inapplicable to Home Rule Cities

THE constitutional amendment adopted by Michigan voters in 1932, limiting the total amount of taxes levied against property to 1½ per cent of the assessed valuation, except taxes for payment of interest and principal on obligations previously incurred, has been declared inapplicable to home rule cities. Prior legislation had authorized taxation in home rule cities up to 2 per cent of the assessed valuation.

On the basis of the limitation amendment, action was brought by the School District of the city of Pontiac against the city of Pontiac to restrain the city from exceeding the 1½ per cent limitation. From a decree dismissing the plaintiff's bill of complaint, appeal was taken. The Court held that the status of municipal home rule should have been called to the attention of the framers of the amendment and that the provisions of home rule charters should have been included as an exemption. The Court also held that this exemption should likewise apply to cities under special charters having like powers as to taxation. Also, in villages and cities of the fourth class that have been vested with special limitations and have exercised that power in effect as a home rule power, the amendment would be void where conflicting with provisions for higher limits.

New York Abolishes Personal Property Tax

THE repeal of the ancient personal property tax in New York was quietly effected by the last Legislature. Although every tax commission for the past fifty years has recommended the discontinuance of this tax, the reform when it finally came had little public notice.

Personal property was divided into tangibles and intangibles under the New York law. Intangibles could easily be concealed, assessments were made in an arbitrary and capricious manner, and only a minor fraction of the assessments made were collected. The yield from this tax in 1932 was only a fraction more than one per cent of the general property tax. "In the course of the evolution of the tax system of the state the personal property tax has tended to become progressively obsolete," declared the New York State Commission for the Revision of the Tax Laws in 1932.

The tax is abolished as of July 1, 1933, but as the city assessments became of force in March they will be collected for this year. The personal income tax adopted in 1919 and the franchise tax on the income of corporations are comparatively recent taxes which have superseded the personal property tax. A tax on the net income of unincorporated businesses has also been proposed to replace the old levy.

Prepared by
City Planning and Zoning"
FRANK B. WILLIAMS
Author of "The Law of

ZONING and PLANNING NOTES

From Data collected
by the Zoning Committee
of New York
(233 Broadway)

Streets

CALIFORNIA.—*Ex parte Anderson*, 19 Pac. 2d, 1027 (District Court of Appeals, March 15, 1933).—An ordinance setting aside a portion of two public highways for exclusive use as a public market for certain parts of three days each week, is valid, and a fine imposed upon the owner of an automobile parking contrary to this ordinance is valid. The highways are for the use of the public for traffic; but the regulation, confining marketing to a part of the street and leaving the rest open for passage, is in aid of traffic; and no abutter has objected.

PENNSYLVANIA. — *Farmers - Kissinger Market House Co., Inc., v. City of Reading*, 165 Atl. 398 (Supreme Court, March 27, 1933).—A city ordinance prohibits vehicular use, construction and maintenance of private driveways across the sidewalks of certain busy streets. Plaintiff owns land abutting on one of these streets and on another street. In the rear of the market building on one of them the plaintiff has constructed a large garage, to which there is access on the front of the lot. He seeks access to the garage also by a roadway crossing the curb in the rear of the lot, into one of these busy streets, which the city, relying upon the ordinance, refuses to give him. The Court holds that the ordinance is valid.

EDITOR'S NOTE: The owner of land abutting upon the street is entitled by law to access to his property from the street for any reasonable purpose. It is true that he must apply to the public authorities for permission to lower the curb, but if in a proper case this permission is refused, he may obtain it by court action. The right of access is subject to reasonable regulation. In this case the owner of land abutting upon two streets is denied access by one street because he has reasonable access by another; the street which he is not allowed to use being a very busy one.

Zoning—Earth Products

OKLAHOMA.—*Anderson-Kerr, Inc., v. Van Meter*, 19 Pac. 2d, 1068 (Supreme Court, March 14, 1933).—An ordinance of the city making it unlawful to drill gas wells within 300 feet of the outer line of an oil and gas drilling zone is constitutional; and the refusal of the board of adjustment to grant the privilege in this case, as a variance, cannot be held by the Court to be an improper exercise of its discretion.

EDITOR'S NOTE: Our readers will remember a similar Oklahoma case in our February "Notes."

Zoning in Cleveland and Denver

The Cleveland Board of Zoning Appeals has issued, in typewritten form, its report for the year 1932, this being the third annual report of the Board.

The Board of Adjustment of the City and County of Denver has issued a similar report for the year ending February 10, 1933.

Transition Zoning

Arthur C. Comey, city planner and Assistant Professor in the Harvard School of City Planning, has written a treatise entitled "Transitional Zoning," which is published as the fifth of the City Planning Studies of the School. The purpose of this work is stated in the Introduction by Theodora Kimball Hubbard, Editor of Research. It is devoted to the specialized treatment of the borders of zoning districts so as to mitigate the detrimental effect to property on the edge of one zoning district resulting from the actual or prospective use of adjacent property in a less restricted district. The author has compiled from an inspection of three-fourths of all the zoning ordinances already adopted in the United States all the instances of such zoning transition clauses, to which are added model clauses not now found in effect. Legal aspects are also discussed in the light of the cases.

Recent City Manager Appointments

FRANK T. ADAMS is the first City Manager of Presque Isle, Maine, under its recently adopted council-manager charter.

T. C. Briggs became City Manager of Rochester, N. Y., on May 1, succeeding C. Arthur Poole.

W. H. Brooks, Village Auditor for two years, was appointed Village Manager and Assessor of Oak Park, Mich., on May 5, succeeding Arthur W. Stephens.

Ernest T. Conlon, former senator, succeeded C. Sophus Johnson as City Manager of Grand Rapids, Mich., on May 1.

E. H. Crofoot is temporary City Manager of Mason City, Iowa, until a permanent appointment is made to fill the vacancy created by the resignation of P. F. Hopkins.

J. G. Morgan, a local engineer, was selected City Manager of Austin, Texas, at a recent meeting of the Council, to succeed Adam R. Johnson.

Guy Parker had been cashier of a local bank and also Chief Deputy Assessor of Eastland County before he succeeded W. C. Marlow as City Manager of Eastland, Texas, on April 10.

J. J. Philippe was appointed City Manager of Visalia, Calif., on April 26, after the resignation of B. J. Pardee.

Iowa Conservation Plan Aids Conservation Corps Work

AT the time President Roosevelt announced the Civilian Conservation Corps project, the state authorities in Iowa had just received a complete set of plans and reports on the Twenty-Five Year State Conservation Plan.* This plan deals in a fundamental way with those elements of conservation to be attacked by the civilian corps—erosion control, woodland preservation and reforestation, and stream and lake control and maintenance. Hence, in two days a state program was drawn up to absorb Iowa's full quota of civilian corps men (and probably more) on work constituting part of a balanced long-term plan in which each item is of assured public value. It is understood that the President gave this program his personal approval, the first among the state programs. Thus the civilian corps work and the Iowa conservation plan both profit greatly by the fact that the plan was ready for use when the emergency corps became available. The whole conservation plan project is justified at one stroke. Meanwhile, other states, with more urgent and larger conservation problems, but without conservation plans or any sort of plans, flounder around in a hurry, looking for work which will qualify.

JACOB L. CRANE, JR.

* See page 79 of this issue.

The Municipal Bond Market

Recent sales of new issues, from May numbers of *The Bond Buyer:*

Amount	Borrower and Purpose	Rate (%)	Term (Years)	Basis (%)
$1,000,000	Maine, Highway and Bridge	4	6-15 (ser.)	4.53
125,000	Hartford, Conn., School District	4½	2-26 (ser.)	4.45
200,000	Sheboygan Co., Wis., Highway Improvement	4½	12¾	4.5
1,470,000	Worcester Co., Mass., Hospital Funding	4½	7½ (avg.)	4.47
115,000	Clinton Co., Ia., Primary Road Refunding	4¾	12 (avg.)	4.74
1,000,000	Alameda Co., Calif., Relief	4.9	8.9 (avg.)	4.89
100,000	Leominster, Mass., Sewer	5	14½ (avg.)	5
200,000	New London, Conn., Welfare and Improvement	5	1-10 (ser.)	5.33
5,000,000	New Jersey, Emergency Relief	5	1-8 (ser.)	5
200,000	Newport, N. H., Refunding and Water	5½	13 1/3 (avg.)	5.49
750,000	Bristol, Conn., Refunding	5½	1-15 (ser.)	5.5
540,000	Utica, N. Y., Sewers and Welfare	5¾	6.8 (avg.)	5.72
550,000	Schenectady, N. Y., Relief and Construction	5.70	6	5.64
4,000,000	Buffalo, N. Y., Relief	6	10	6

TRAFFIC CONTROL AND FACILITATION

Conducted by Publications Committee, Institute of Traffic Engineers, 175 Fifth Ave., New York

Maxwell Halsey, Chairman, Harry Hemmings, Reyburn Hoffman, Benoit Laberge, Theodore T. McCroskey, Donald M. McNeil, A. J. Naquin, Hawley S. Simpson, Arthur G. Straetz, Peter J. Stupka, Lawrence S. Tuttle, John C. Wrighton

Massachusetts Studies Traffic in Cities with Bad Accident Records

By HAROLD F. HAMMOND
Engineering Representative,
Governor's Committee on Street and Highway Safety

THE Governor's Committee on Street and Highway Safety has completed a new type of city-wide traffic safety survey in two Massachusetts communities which presented most perplexing automobile accident problems. The studies were designed and engineered entirely with a view toward improved safety on the streets, rather than toward the solution of the traffic problem from an economic or expeditious standpoint.

Brockton and Chelsea were the two cities in which these comprehensive studies were made. The survey in the former has definitely proved the value of modern methods of combating a rising toll of deaths and injuries by reducing a five-year average annual 21 per cent increase in motor-vehicle fatalities to a 46.6 per cent decrease during 1932. The Chelsea survey, upon its completion in February, was submitted to the local authorities, hence sufficient time has not elapsed for the recording of results. The need for following out the recommendations, however, appealed to municipal officials so strongly that many of them are already being put into effect. These include such items as better coordination of enforcement with accident locations and frequency, removal of physical hazards and increased educational work among school children.

In the city of Quincy and the towns of Methuen and Winchester, three preliminary studies have been made with a view toward more complete detailed traffic safety survey studies if requested by the local authorities. The preliminary studies comprised an analysis of the accident experience of these communities which pointed to certain hazards and weaknesses in policy calling for special attention. In Quincy, where a change in administration forestalled the subsequent thorough study, a decidedly poor motor-vehicle accident record has failed to improve. In Methuen and Winchester, the studies indicated the need for closer correlation of police and highway department activities with the accident areas, and such correlation has been materially effected.

Mayor Horace C. Baker, who assumed office in Brockton on January 1, 1932, was anxious to eliminate his city from the class of communities holding the worst highway accident records in the state, and in order to do this called on the Governor's Committee on Street and Highway Safety for assistance. The Committee promptly organized the traffic safety survey.

In Brockton

Brockton, a city of 63,000 population, may be rightfully termed "The Laboratory City," mainly because of its previous poor accident record which offered the most crucial test of the proposed effort by the Governor's Committee to prove the value of modern highway safety methods. In the past six years 64 fatalities and more than 3,000 injuries had resulted from highway accidents in that city.

The outstanding features of the survey, as illustrated in Figure 1, were the direct supervision of the survey by prominent Brockton citizens who comprised the Advisory and Survey Committees; a careful analysis of all previous accidents—when, where, how and why they occurred; and a statement of the necessary remedial measures to eliminate the causes of previous mishaps. These were embodied in the form of conclusions and recommendations which were submitted to the Advisory and Survey Committees.

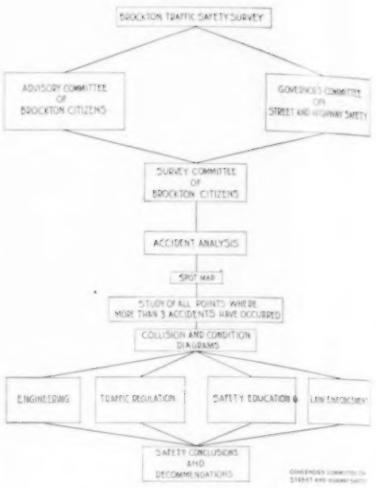


FIG. 1.—ORGANIZATION OF THE BROCKTON SURVEY

Engineers of the Governor's Committee, assisted by the Survey Committee, reporting frequently to the Advisory Committee of Brockton, conducted all the necessary studies and actual field work. The cooperation of these three bodies was largely responsible for the speed with which the survey was conducted and the prompt adoption of various safety recommendations, the value of which became apparent in an almost immediate improvement in the accident record of Brockton.

The preliminary survey revealed several significant facts, among them:

1. Thirty-seven per cent of the fatalities in the previous three years had occurred on Main Street.
2. Eighty-five per cent of the 1931 fatalities were to pedestrians.
3. The ratio of child injuries and fatalities was unusually high.
4. The most dangerous section in the city included a one-half mile stretch of Main Street on each side of the center of the business section.
5. Thirty-five per cent of the intersection accidents occurred at 11 per cent of that type of location having an accident history.
6. Traffic-law enforcement and regulation was at an extremely low ebb.

The law enforcement angle, illustrated in Figure 2, early in the survey, indi-

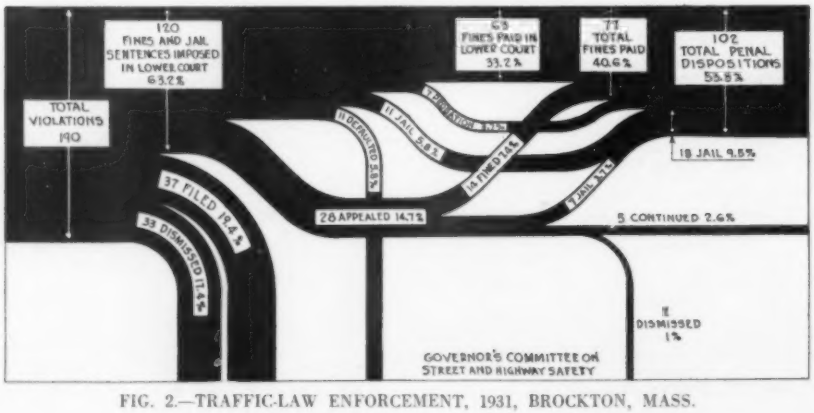

120 FINES AND JAIL SENTENCES IMPOSED IN LOWER COURT 63.2%
63 FINES PAID IN LOWER COURT 33.2%
77 TOTAL FINES PAID 40.6%
102 TOTAL PENAL DISPOSITIONS 53.8%
TOTAL VIOLATIONS 190
11 GUARANTEED 5.8%
11 JAIL 5.8%
14 FINED 7.4%
18 JAIL 9.5%
37 FILED 19.4%
33 DISMISSED 17.4%
28 APPEALED 14.7%
5 CONTINUED 2.6%
2 DISMISSED 1%
GOVERNOR'S COMMITTEE ON STREET AND HIGHWAY SAFETY

FIG. 2.—TRAFFIC-LAW ENFORCEMENT, 1931, BROCKTON, MASS.

cated the need of a drastic change in motor-vehicle law regulation and prosecution. Despite the size of the city and its previous accident record, there were but 190 automobile violations disposed of by the courts during 1931, of which only 53.8 per cent resulted in final penal disposition, either in the lower court or on appeal to the higher courts.

While the survey indicated the need for engineering remedial measures in certain sections of the city where high accident frequency was encountered, as well as an immediate and intensive program of child education, the law enforcement problem was the most pressing and for that reason one of the chief recommendations evolved was that calling for a reorganization of the Police Department (at no added expense to the city) to form a Traffic Bureau with the sole function of handling the problem of motor-vehicle regulation, control and prosecution of law violators.

Recommendations which were finally presented to the Advisory and Survey Committees included remedial measures for the twenty most dangerous intersections in the city; the organization of a Traffic Bureau; the placing of charts in the hands of the Police Department for their guidance, showing accidents and safe approach speeds at the most dangerous points in the city; the institution of an intensive educational program in all schools of the city as part of the school curricula, and the organization of a permanent Safety Council to correlate all safety functions of the police, school and civic organization activities into a real accident prevention program.

The actual accomplishments and improvements noted thus far, since completion of the survey, include a 46.6 per cent reduction in fatalities (during 1932), as compared to 1931. Furthermore, there has been a noted improvement in the accident history of the twenty most dangerous intersections at which safe approach speeds, elimination of physical hazards, directional and warning signs and other engineering measures were put into effect.

The Traffic Bureau has been organized along the lines laid down in the report. *Motor-vehicle prosecutions have tripled over the previous year*, and motor-vehicle law enforcement will continue to be administered in accordance with the recommendations of the survey. The recommended educational program has been initiated in the public schools and a permanent Safety Council has been organized, with application already made to the National Safety Council for a charter.

In Chelsea

In Chelsea the chief recommendations, developing out of the comprehensive survey, were the establishment of a centralized Traffic Commission, greater concentration on enforcement at accident centers and a moderate increase in police protection. One of the most startling findings of the study was the prevalence of motor accidents to school children. During 1931, 38 per cent of the persons injured by motor vehicles in that city were pedestrians, as were all eight fatalities. With negligible exceptions, the outstanding age group among the pedestrians injured was that of 5—14 years. To meet this most pressing phase of the problem, the Committee recommended intensive community educational work in the comparatively few spots where the accidents had occurred most frequently.

The report indicated need for closer correlation between law enforcement activities and accident locations, times of day, day of the week, when and where most accidents were found to have occurred. The findings confirmed belief that police should first apprehend motorists for traffic-law violations at those locations where the hazards to the public are the greatest. The theory is that not only will the hazards be directly attacked, but that the average driver will take a cooperative rather than an antagonistic view, if he knows he has been brought to task for committing a serious fault, likely to lead to disaster.

The Committee found in an analysis of a sizable group of prosecutions that only 20 per cent of the violations were committed at the 38 high accident frequency locations. The remaining number of violations, or 80 per cent, were committed at locations having practically a negligible accident history according to all available information.

Analysis of the records showed that 66.6 per cent of the automobile accidents in 1931 took place between noon and 9:00 P. M., and that 47 per cent occurred between 3:00 P. M. and 9:00 P. M. The recommendation followed that the assignment of police officers should be planned with this in view. The same suggestion dealt with greater concentration of enforcement on Wednesdays and Saturdays.

Stricter enforcement of speed laws on specific stretches of highway was suggested, with definite booking and warning speeds stated, as a result of a scale carefully worked out on the basis of visibility and safe stopping speeds. It was found on the most dangerous route that as a matter of daily practice 90 per cent of the motorists were driving at a safe speed, but that the remaining 10 per cent drove at speeds constituting a menace to public safety. A wide disregard of stop signs was found, and a recommendation was made for the tightening-up of enforcement, pointing out the most dangerous locations where application should first be made.

Detailed studies were made of the 26 most dangerous intersections, which had been the scene of exactly half of all the intersection accidents in the city. Twelve stretches of streets between intersections received similar treatment.

The entire survey was made with the cooperation of Mayor Lawrence F. Quigley and the Chelsea Safety Committee, made up of leaders in various fields of civic activity. A feature was the assistance given in the detailed work by men supplied by the local Welfare Department.

Housing Survey Stirs Action in Delaware

AS a result of a housing survey completed last year, Delaware is wholeheartedly behind a constructive housing program which has suggestions for other states. On May 16 the appropriation bill for the State Housing Board passed both houses of the Legislature. The bill creating this new Board was previously passed unanimously by both houses. The Governor is now selecting the Board personnel.

Just as the organized women of the state got action on the housing survey by bringing social pressure to bear upon the groups in the community with conflicting interests in housing, so the same women won a final victory in the passage of the appropriation measure. The bill was first defeated in the Assembly, but the women revived the measure over night and won enough votes to give them the victory by a considerable majority.

Delaware last year decided to take advantage of the employment crisis to investigate and make an inventory of its own housing. It used unemployed engineers and draftsmen with funds supplied by the Governor's Unemployment Relief Commission. Undertaken by the temporary Housing Commission of Delaware, the housing survey of the city of Wilmington is probably the first of its particular kind. This survey was handled from the economic as well as the social standpoint so familiar to welfare workers.

Wilmington now knows where its tuberculosis area is and why; its delinquency area and why, as influenced by bad housing; where its sheriff's writs are most prevalent and why; the amount of doubling-up of families; what is the relation of income to available housing; the area of needed rehabilitation; and the price range for needed new housing.

Following the Philadelphia plan originated by Dr. Frank Parker, the Wilmington Chamber of Commerce initiated a "renovize" drive with a $500,000 goal for this city of 110,000. Unlike the Philadelphia method, the pledges were secured not by women but by men on unemployed relief funds. The women, through the State Federation of Women's Clubs, have offered their services in a campaign to make the pledges effective.

The next step in the Wilmington housing program calls for new construction in the indicated price ranges. Two types of construction are being studied, the individual row house with front and back yard at about $5 per room, and the apartment house of two, three and four stories in height with community gardens and playgrounds. The fourth step will be a city planning program to restore and to protect values and proper development.

The newly created State Board of Housing will take over the results and recommendations of the housing survey commission as a continuing program.

MRS. H. DUEY HOFFMAN.

THE CITY'S LEGAL RIGHTS AND DUTIES

Conducted by A. L. H. STREET, Attorney at Law

Accidents

Statute held to make city liable for negligent operation of fire truck (Wisconsin Supreme Court: *Schumacher v. City of Milwaukee*, 243 N. W. 756).

Ordinance requiring abutters to keep sidewalks in repair held not to exempt city from liability for accidents resulting from defects (Oregon Supreme Court: *Large v. City of St. Helens*, 14 Pac. 2d, 628).

Bonds

Outstanding sewer warrants held not part of city's outstanding obligations within meaning of statute governing issuance of refunding bonds (Minnesota Supreme Court: *Leslie v. City of White Bear Lake*, 243 N. W. 786).

Business Regulations

Ordinance forbidding peddlers, etc., to enter private premises without invitation held unconstitutional (United States District Court, District of Wyoming: *Fuller Brush Co. v. Town of Green River*, 60 Fed. 2d, 613).

City held subject to injunction against interfering with entrance of patrons into place of business as a substitute for prosecuting for any gaming conducted or for confiscating gambling devices (New Jersey Court of Chancery: *Miller v. City of Atlantic City*, 162 Atl. 143).

Depositories

Funds deposited in bank of which mayor and clerk were officers held impressed with trust in favor of municipality (Nebraska Supreme Court: *Union National Bank v. Village of Beemer*, 244 N. W. 303).

Finance

Contract to pay for plant equipment in installments out of special fund held to create debt within constitutional limit as indirectly imposing obligation upon general revenues (California Supreme Court: *Garrett v. Swanton*, 13 Pac. 2d, 725).

Franchises

City held not entitled to recover for use of streets for telephone system after expiration of franchise (Iowa Supreme Court: *City of Pella v. Fowler*, 244 N. W. 734).

Licenses

Statute exempting war veterans from payment of license taxes held unconstitutional (Illinois Supreme Court: *Marallis v. City of Chicago*, 182 N. E. 394).

Municipal motor vehicles held subject to state registration fee although exempt from property taxation (Florida Supreme Court: *State v. Cahoon*, 143 So. 253).

Public Grounds

Occupants of public land held not to have acquired title by adverse possession as against town (Massachusetts Supreme Judicial Court: *Bates v. Town of Cohasset*, 182 N. E. 284).

Public Utilities

Constitutional power to control streets held not to authorize prohibition against operation of interurban motor-busses doing no local business (Michigan Supreme Court: *Detroit, Wyandotte & Trenton Transit Co. v. City of Detroit*, 244 N. W. 424).

Electric utility held entitled to compensation for compulsory relocation of conduits, etc. (Wisconsin Supreme Court: *Milwaukee Electric Railway & Light Co. v. City of Milwaukee*, 245 N. W. 856, 860).

Railroads

Certain items held not recoverable by abutting property owners as damages resulting from separation of street and railroad grades (Michigan Supreme Court: *In re City of Detroit*, 246 N. W. 51).

Removing Officials

Second proceeding to remove officer held not to bar appeal in first proceeding (North Dakota Supreme Court: *State v. Board of City Commissioners of City of Fargo*, 245 N. W. 887).

Sabbath Observance

State law banning Sunday labor held not invalid as against exhibition of movie films shipped in interstate commerce (United States Circuit Court of Appeal, Tenth Circuit: *Boynton v. Fox West Coast Theatres Corporation*, 60 Fed. 2d, 851).

Sewers and Drains

City held not liable for overflow of premises due to insufficient drain (Georgia Court of Appeals: *City of Macon v. Douglas*, 165 S. E. 922).

City held not liable because sewer-drainage system was insufficient to carry natural flow (Georgia Court of Appeals: *Neese v. City of Atlanta*, 165 S. E. 165).

Petitioner for paving held estopped by payment of assessment installment to complain that sewer was included (Georgia Court of Appeals: *Collier v. City of Barnesville*, 165 S. E. 146).

Special Assessments

Provision maturing all annual installments under street improvement assessment on taxpayer's delinquency as to one, held invalid as being unauthorized by statute (Springfield, Mo., Court of Appeals: *City of Neosho v. Kelley*, 52 S. W. 2d, 565).

Streets

Street improvement ordinances held not invalid as making inadequate provision for payment of damages to abutting property, etc. (Illinois Supreme Court: *City of Dixon v. Sinow & Wein*, 183 N. E. 570).

City dock departments' ramp approach to dock held removable as street encroachment (New York Court of Appeals: *Peterson v. City of New York*, 183 N. E. 280).

Taxpayer held entitled to sue to enjoin removal of part of parkway in center of street for benefit of adjacent filling station (Indiana Appellate Court: *Regester v. Lincoln Oil Refining Co.*, 183 N. E. 693).

Taxation

City held liable for loss to school district resulting from city treasurer's neglect to collect taxes (Michigan Supreme Court: *School District v. City of Lansing*, 245 N. W. 449).

Non-appealing taxpayer held not relieved from liability by reduction of taxes assessed against others (Pennsylvania Court of Common Pleas, Luzerne County: *Kingston Coal Co. v. County of Luzerne*, 24 Pa. Munic. Law Rep. 49).

Traffic Regulations

Prohibition against pedestrians crossing roadways within traffic district except on crosswalks upheld (California District Court of Appeal: *Hopkins v. Galland Mercantile Laundry Co.*, 14 Pac. 2d, 325).

Parking ordinance upheld as against lessee of abutting business premises (Georgia Supreme Court: *Borough of Atlanta v. Kirk*, 165 S. E. 69).

Transportation

Statute providing for organization of corporations to furnish local transportation in Chicago upheld (Illinois Supreme Court: *People v. City of Chicago*, 182 N. E. 419).

Ordinance regulating intercity busses held to transcend municipal powers limited to local traffic regulations and reasonable license fee (Michigan Supreme Court: *North Star Line v. City of Grand Rapids*, 244 N. W. 192).

Water Supply

Metropolitan district water main assessment upheld (Connecticut Supreme Court of Errors: *Hopkins v. Metropolitan District*, 161 Atl. 848).

Village board's contract to submit to electorate proposal for a water system held invalid, in absence of express statutory authority, as restricting exercise of the board's powers (New York Supreme Court, Appellate Division: *Wells v. Village of East Aurora*, 259 N. Y. 598).

MUNICIPAL AND CIVIC PUBLICATIONS

Prices quoted do not include postage, unless so stated.

Municipal Engineering

Official Proceedings of the Thirty-eighth Annual Convention of the American Society of Municipal Engineers, Held at Detroit, Mich., January 16-18, 1933. *Compiled by C. W. S. Sammelman, Executive Director of the Society. Published April* 1, 1933. 693 *pp. Illustrated.* $7.50 *from the Society,* 4359 *Lindell Blvd., St. Louis, Mo.*

Papers and discussions by authorities in the following divisions of the field: city planning, airports and landing fields; street and traffic lighting; traffic control; water works; refuse disposal and street cleaning; sewerage and sanitation; municipal legislation and finance; public utilities; street paving, design, construction and maintenance; municipal field engineering; municipal engineering personnel; highway sidewalks. Also committee reports, directories, etc.

Electrical Estimates

Man-Hour Electrical Estimating Manual. By Theodore Heinzerling. Rurick Press, Inc., New York. 1932. 384 *pp.* $10.00.

This volume, by a consulting electrical engineer, contains labor data for making and checking estimates for electrical installations of great variety. It provides city and state engineering departments with a convenient method of estimating the costs of proposed electrical construction and of checking bids for such work. It includes directions for preparing estimates and using the data in the book, followed by 366 pages of man-hour data on three bases—conservative, compensative, and competitive. There are also six wiring charts giving much useful data.

Public Employment Offices

Statistical Procedure of Public Employment Offices: An Analysis of Practice in Various Countries and a Plan for Standard Procedure in the United States, Made for the Committee on Governmental Labor Statistics of the American Statistical Association.—By Annabel H. Stewart and Bryce M. Stewart. Russell Sage Foundation, New York. 1933. 327 *pp.* $2.50 *from* THE AMERICAN CITY.

A study of methods of recording applications for work and openings for workers, covering: an analysis of the statistical procedures studied; a survey of statistical procedures in Great Britain, Switzerland, Sweden, Canada, Germany, France, and the United States; a suggested plan for statistical procedure of public employment offices in the United States. The appendices contain a selected bibliography, report forms, and other information.

Municipal Powers

"Construction and Operation of Municipal Powers," by Charles W. Tooke, of the New York University Law School, has been reprinted from the *Temple Law Quarterly* for April, 1933. 23 pp. It discusses the political and legal bases of the existence and the maintenance of local government, analyzing the possible approaches to the problems of the extent, interpretation, and exercise of powers by municipalities. It is a study of legislative control through a statutory enumeration of municipal powers, and the functioning of the judiciary to determine whether in any given case a municipal act has been authorized by the legislature, and exercised in the way prescribed. (Apply to the author, New York University Law School, Washington Square, East, New York.)

Unemployment Relief

The U. S. Department of Labor issued on May 1, 1933, a "Handbook for Agencies Selecting Men for Emergency Conservation Work," to promote uniformity, smoothness and effectiveness of administration. It tells what the emergency conservation work is, explains the Federal and state organization, how the men are selected, what the requirements are, the nature of the work, and its conditions, etc. (Apply to the Department, Washington, D. C.)

Street Traffic Control

Street Traffic Flow.—By Henry Watson. Chapman & Hall, Ltd., 11 *Henrietta St., Covent Garden, W.C.2, London, England.* 1933. 8vo. *XII* + 395 *pp.* 21 *plates and* 89 *figures and diagrams.* 21 *shillings net; plus* 9 *pence postage.*

As the title indicates, this book is concerned primarily with the problems involved in the movement of vehicles, principally in urban areas. It deals intensively with the effect of the various types of public and private vehicles upon the efficiency of traffic movement and suggests practical remedies which may be employed to expedite traffic flow and at the same time reduce street accidents. Attention is directed mainly to conditions in England, where streets are generally of more limited width, and obstruction to traffic occasioned by parked and slow-moving vehicles is relatively more important than in the United States, where streets are usually fairly wide and intersection delays are of greatest concern. The author, however, does not neglect the crossing problem and deals with traffic movements at both unregulated and signal-controlled intersections as well as at traffic circles. The layout of streets and cities to reduce traffic conflicts is discussed, and chapters on street accident statistics in Great Britain, with suggestions for the reduction of the accident toll, are included. The author deals also with policies by public transportation managements and municipal officials in determining the most economic methods of achieving street traffic improvement.

The book is well illustrated and indexed and includes a bibliography of traffic literature in both Great Britain and the United States.

HAWLEY S. SIMPSON.

The Use of Daylight

The Orientation of Buildings—Being the Report with Appendices of the R.I.B.A. Joint Committee on the Orientation of Buildings. Published by the Royal Institute of British Architects, 9 *Conduit St., W.1, London, England.* 70 *pp. Many illustrations.* 5*s.* 6*d. postpaid.*

This report, based upon thorough research and the latest available knowledge, presents a technique in the planning and orientation of buildings to take advantage of as much sunshine as the climate affords. Section III is of particular interest—the study and analysis of problems of isolation affecting practical design in hospitals, schools, dwelling houses, offices and factories, and town planning. Its importance to architects, medical officers of health, and town planners is evident.

Police

The Policewoman's Handbook.—By Eleonore L. Hutzel, Deputy Commissioner of the Detroit Police Department; assisted by Madeline L. MacGregor, Chief of Social Service, Grand Rapids Child Guidance Clinic; with an Introduction by Leonard V. Harrison, Bureau of Social Hygiene, New York. Columbia University Press, New York. 1933. *VI* + 303 *pp.* $2.00 *from* THE AMERICAN CITY.

The main text is on the *work* of policewomen, the principles of selecting policewomen being dealt with in the Introduction, which also explains why there is no chapter on the organization of policewomen's bureaus. Field work; the investigation of complaints; criminal law procedure and the preparation of cases for courts; evidence in special types of offenses; detention of women and children; cooperation with other agencies; and cases illustrative of the various divisions of the work—these topics are the framework of the book.

Salaries

In the *International Fire Fighter* for April, 1933, there is a table of "Basic Salaries That Prevail in Fire Departments in the United States and Canada, January, 1933." 9 pp. Covering 486 municipalities. Subscription, $2.00 a year. (Apply to the magazine, American Federation of Labor Bldg., Washington, D. C.)

Municipal Ownership

Paul Jerome Raver, Assistant Professor of Public Utilities, Northwestern University, presents a statistical study of municipal ownership of electric light and power in the last five years, in the current (May) issue of the quarterly *Journal of Land and Public Utility Economics.* He states that the total number of municipal enterprises in that field (including municipal generating plants for street lighting, etc., as well as those selling current) was 1,885 on December 31, 1932, as against 2,424 on December 31, 1927; but only 9 per cent of the decrease took place in the last two years. Ninety new establishments, 43 of them generating, were started in the last five years, 66 of which originated in the last two; 23 of the 66 were generating plants. Somewhat less than half of the additions, and more than half of the establishments changing to private ownership, were in places of less than 500 population. The number of generating plants on December 31, 1932, was 914. (Apply to the *Journal,* 337 E. Chicago Ave., Chicago, Ill.)

Housing

There have recently been compiled by the Division of Building and Housing, Bureau of Standards, U. S. Department of Commerce, six reports as follows:

"Regional Planning Commission or Organizations in the United States"; "City Planning Commissions in the United States"; "A Survey of City Planning and Related Laws in 1932"; "A Survey of Zoning Laws and Ordinances Adopted during 1932"; "Zoned Municipalities in the United States"; "Zoned Municipalities by Population Groups." (Excerpted from "Zoned Municipalities in the United States." *Do not order both reports.*) (Apply to the Division.)

The National Committee on Wood Utilization, of the U. S. Department of Commerce, announces an 85-page illustrated bulletin entitled "How to Judge a House." It points out the details of design and construction, a knowledge of which will enable the non-technical prospective purchaser to determine the value of a house and to avoid extravagance in building. 10c. (Apply to Superintendent of Documents, Washington, D. C.)

"Housing of Families of the American Federation of Full-Fashioned Hosiery Workers, Local Nos. 1 and 39, Philadelphia, June-July, 1932, by W. W. Jeanes, of Kastner & Stonorov, architects, 308 S. Smedley St., Philadelphia, Pa. 1933. 69 pp. Many maps, charts, and tables. $1.00; in lots of more than six, 75c each. The data were collected by intelligent interviewers from 1,385 families of the workers themselves, on a friendly basis. The topics covered included: the status of home ownership, and of the family; income wages; housing costs; transportation to work; and recreation. (Apply to the author.)

Land Condemnation

A 59-page pamphlet, "Condemnation Procedure and Land Purchase Practices in New York State Municipalities," by Elwyn E. Mariner, under the auspices of the School of Citizenship and Public Affairs of Syracuse University, has been issued as Publication No. 21 of the New York State Conference of Mayors and Other Municipal Officials, Bureau of Training and Research, Albany, N. Y. 1933. (Apply to the Bureau.)

Traffic

The Institute of Traffic Engineers (175 Fifth Ave., New York) has begun (May, 1933) the publication, for members, of a mimeographed monthly News Letter entitled *Traffic Engineering,* edited by the Library Committee, which also prepares a monthly review of current literature on street and highway traffic entitled *Traffic Digest* ($2.00 a year; single copies, 25c). (Apply to the Institute.

TELEPHONE LINES . . . putting her in instant two-way communication with a larger world—broadening her interests and extending her influence—rendering more simple the important business of managing a household. No item of home equipment contributes more to the security, the happiness and the efficiency of millions of women than the telephone.

The telephone has helped to make the nation a neighborhood and keep *you* close to people and places. Quickly, and at small cost, you can talk with almost any one, anywhere . . . in the next block, the next county, a distant state, or on a ship at sea.

There are times when being "in touch" is vital, urgent . . . a sound in the night, a whiff of smoke, a sudden illness. There are times when the mere convenience of the telephone gives it an important place among life's necessities . . . to shop from your home, to chat with a friend, to handle, quickly and efficiently, the varied duties of a busy household. And there are times—many times daily—when the telephone is the indispensable right arm of business.

To make this possible, the Bell System provides millions of miles of wire and the services of an army of trained employees. They stand ready to answer your call; they offer you the service of a friend.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY

Constructive Economy

Practical suggestions for constructive economy in local government are given in a pamphlet of 58 pages, "How Cities Can Cut Costs," by Clarence E. Ridley and Orin F. Nolting, Editors of *Public Management*, published by The International City Managers' Association (923 E. 60th St., Chicago, Ill.) and supplied at $1.00 a copy. It covers economies in management, office practice, financial administration, public welfare, public works, police and fire administration, public health, education, public libraries, planning and housing, elections, and governmental structure, and discusses methods whereby essential community services may be maintained in the face of the need for reduction of public expenditures. (Apply to the Association.)

"A Citizens' Council—Why and How?" is an 8-page pamphlet presenting a device to unite civic groups in their common aim to achieve economy in local government without sacrifice of essential services. "It is important to begin at once." (Apply to the Committee on Citizens' Councils for Constructive Economy, 309 E. 34th St., New York.)

Relief Work

"How to Help" is the Handbook of the National Women's Committee, Welfare and Relief Mobilization, 570 Lexington Ave., New York, published this year. In its 74 pages it gives in readable form an outline of the social problems in any community and of the essential services by which they may be met. Included there is a list of the 31 national social agencies, with their purposes and services, which were a part of the Welfare and Relief Mobilization. (Apply to the organization.)

The Use of Leisure Time

The National Recreation Association has published a pocket-size pamphlet of 58 pages called "Recreation and Unemployment," which shows the great need of counteracting the demoralizing effects of unemployment by organized recreational use of leisure time, and how this is being done in various places. It is full of practical suggestions for organizing and extending such activities for the bodily, mental, and spiritual welfare of the members of the community. 25c. (Apply to the Association, 315 Fourth Ave., New York.)

Milk Inspection

"How Municipalities Safeguard Milk Supplies," by John F. Kingsley, City Chemist, Newburgh, N. Y., is the title of a radio address delivered April 1, 1933, over station WGY in the Municipal Series. It is presented in 5 mimeographed pages by the New York Conference of Mayors and Other Municipal Officials, City Hall, Albany, N. Y. Definite information is given about the tests, inspections, and regulations by which milk sanitarians endeavor to keep disease germs out of milk supplies, and about the "secondary line of defense"—pasteurization. (Apply to the Conference.)

Theaters

"The Work of the Little Theaters: The Groups They Include, the Plays They Produce, Their Tournaments, and the Handbooks They Use, an excellent handbook of 228 pages, by Clarence Arthur Perry, of the Department of Recreation, Russell Sage Foundation, New York. A selected bibliography for amateur workers in the drama is included, also a list of publishers, with their addresses. $1.50 from THE AMERICAN CITY.

Economics and Business

"Gasoline Distribution in the Twin Cities," by Roland S. Vaile, Professor of Marketing, Alvin L. Nordstrom, Research Assistant in Marketing, and Ralph E. Brewer, Research Assistant in Chemistry, University of Minnesota. February, 1933. 89 pp. Tables, charts. $1.00. (Apply to University of Minnesota Press, Minneapolis.)

Social Welfare

"Social Work Year Book, 1933: A Description of Organized Activities in Social Work and in Related Fields." Second issue. Edited by Fred S. Hall. Published by Russell Sage Foundation. 1933. 680 pp. $4.00. (Apply to the Publication Department of the Foundation, 130 E. 22d St., New York.)

Secondary Roads

"Cement Bound Macadam Pavement," a 16-page pamphlet, with many illustrations, giving the history of this type of pavement, and showing how the revival of interest in it has been evidenced by the application of modern methods and equipment to its construction during the last year. Recommended design and specifications are included. (Apply to Portland Cement Assn., 33 W. Grand Ave., Chicago, Ill.)

Swimming Pools

In the May, 1933, issue of *American Journal of Public Health* and *The Nation's Health*, there is a paper entitled "Application of the Principles of Water Purification to the Control of Swimming Pools," by A. H. Fletcher and A. E. Clark, Sanitary Engineer, Department of Health, Memphis, Tenn.; and Associate Engineer, State Department of Health, Nashville, Tenn., respectively. 19 pp. Diagrams, charts, tables. The health problems encountered in developing municipal swimming pool programs are outlined and illustrated in detail by the experience of Memphis, Tenn., since the beginning of 1930. Important information is given about the results of the treatment of pools with chlorine, ammonia, and copper sulphate. The magazine is 50c a copy. (Apply to the publication, 450 Seventh Ave., New York.

Finance

"The Administration of Municipal Sinking Funds in New York State," by A. Howard Myers, under auspices of the Graduate Faculty of Political Science of Columbia University. Publication No. 20 of the New York State Conference of Mayors and Other Municipal Officials, Bureau of Training and Research, Albany, N. Y. 1933. The chapters are: The Problem; State Legal Provisions and Supervision; Local Legal Provisions and Administration; The Present Condition of Sinking Funds; Summary and Suggested Policy. 40 pp. $1.00. (Apply to the Bureau.)

Trafficways for Chicago

"Limited Ways for the Greater Chicago Traffic Area," a report prepared for the Illinois Commission on Future Road Program, by the Committee on Traffic and Public Safety of the City Council of the City of Chicago; John A. Massen, Chairman. Consultant, Miller McClintock, Director of the Albert Russel Erskine Bureau, Harvard University. December, 1932. 9¼ x 12⅛. 57 pp. The letter of transmittal states that the report demonstrates that here is complete economic justification for the construction of limited ways in the Greater Chicago Traffic Area and sets forth a simple and equitable financial program which will render such construction possible. (Apply to the Committee.)

Home Building and Home Ownership

"General Index to the Final Reports of the President's Conference on Home Building and Home Ownership," prepared under the direction of Dan H. Wheeler; edited by John M. Gries and James Ford. VI + 114 pp. Each of the 11 volumes here indexed has been reviewed in THE AMERICAN CITY. The complete set, without Index, $10.50; with Index, $11.50; single volumes, $1.15. (Checks should be made payable to President's Conference on Home Building and Home Ownership, and sent to the new address, 12 Broadway, New York.)

Industrial Development

Industrial Trends in Wisconsin.—By Edwin M. Fitch and Ruth L. Curtiss, Research Assistants, Department of Economics, University of Wisconsin. A bulletin of the University, Madison, Wis. February, 1933. 58 pp. A preliminary answer to the questions as to the principal industrial advantages and disadvantages of Wisconsin towns and cities, and as to whether the larger or the smaller cities of the state have experienced the more rapid manufacturing growth. (Apply to the University.)

Public Health

"Costs of Venereal Disease to St. Louis," by H. C. Loeffler, C.E., Missouri Social Hygiene Association and St. Louis Bureau of Municipal Research. A survey undertaken June-December, 1932. 44 pp. The costs to metropolitan St. Louis are stated to range between $2,071,000 and $2,560,000 annually. (Apply to Missouri Social Hygiene Association, 2221 Locust St., St. Louis, Mo.)

Sewerage

"Fact and Fancy in Sewerage Financing," by Abel Wolman, Chief Engineer, Maryland Department of Health, Baltimore, presented before the Fifth Annual Meeting of the New York State Sewage Works Association, New York City, January 17, 1933, and reprinted from the *Sewage Works Journal*, March, 1933. 7 pp. Maintaining that, while there is no perfect mathematical rule for sewerage financing, the base of payment should be as close as practicable to the base of benefit, which necessarily involves the use of the combination of the general property tax, the front foot assessment and the service charge. (Apply to the author.)

Conservation

A "Report on the Iowa Twenty-Five Year Conservation Plan" has been prepared for the Iowa Board of Conservation and the Iowa Fish and Game Commission by Jacob L. Crane, Jr., consultant, and George Wheeler Olcott, associate, and recently issued. It is a quarto book of 190 pages, with many photographs, maps, and drawings, including some very effective cartoons, and is a fascinating presentation of important historical and economic facts, and of realizable ideals. The people of Iowa desire to recover, develop and use wisely the natural resources on which their state wealth depends, and to preserve natural beauty for the interest and enjoyment of all; this report shows how these things may be attained, through order and economy in the processes of conservation planning. The material is presented in a practical, direct manner, with principles and details of absorbing interest. $1.00. (Apply to the Iowa Board of Conservation, Des Moines, Iowa.)

Employment Offices

"The United States Employment Service" is the title of a paper-bound volume of 192 pages, by Ruth M. Kellogg, published May, 1933, by the University of Chicago Press, Chicago, Ill. Its chapters include: The Service Previous to 1930; Employment Services Other Than Federal; After-War Years; Structure of the "Doak Reorganization" Plan; Functioning of the "Reorganized" Service; Status of the United States Employment Service; Possibilities for the Future. $1.00. (Apply to the publishers.)

Conservation of Eyesight

"The Visual Fatigue of Motion Pictures" is a pamphlet of 48 pages which offers a world-wide summary and survey, compiled and edited by Aaron E. Singer and published by the Amusement Age Publishing Co., 24 W. 40th St., New York. It presents the efforts and the progress made toward relief of strain upon the eyes, as reported by manufacturers and exhibitors and research advisors in condensed statements, and includes a survey of literature on the subject. (Apply to the publishers.)

Civil Service

"Public Personnel Problems and the Depression—How Civil Service Commissions Are Meeting New Problems," by Raymond M. Gallagher, Department of Political Science, University of Chicago. 17 pp. Supplement to the *National Municipal Review*, April, 1933. (Apply to National Municipal League, 309 E. 34th St., New York.)

Other Reports Received

HOLLAND, MICH.—Annual Report, Board of Public Works, 1932. 50 pp.

ILLINOIS.—Final Report, Housing Commission, April, 1933. 34 pp.

MILWAUKEE, WIS.—Municipal Activities for 1932. Annual Report of the Common Council. 167 pp.

MINNEAPOLIS, MINN.—Budget Facts and Financial Statistics for 1933. Issued by the Board of Estimate and Taxation. 56 pp.

MULTNOMAH COUNTY (PORTLAND), ORE.—Budget Facts and Financial Statistics for 1933; 1932 Annual Report, Tax Supervising and Conservation Commission. 111 pp.

RICHMOND, VA.—Financial Report of the Comptroller, year ended January 31, 1933. 139 pp.

WORTHINGTON *and* WATCH DOG
Water Meters
Used by Chicago
and thousands of other municipalities and water companies

More than

3,200,000

of these meters

in daily use

IN consolidating the meter-building experience of Worthington and Gamon, this organization brings to meter users a line of equipment worthy of most careful consideration.

A complete line of meters . . . for cold and hot water, beverages, chemicals, oil, gasoline and other liquids, and grease.

Backed by a manufacturer pledged to satisfactory performance of its products . . . distributed through a nation-wide chain of meter representatives, and district offices in most of the principal cities.

WORTHINGTON-GAMON METER COMPANY
GENERAL OFFICES: HARRISON, NEW JERSEY
District Sales Offices and Representatives:

ATLANTA	CHICAGO	DENVER	LOS ANGELES	PITTSBURGH	SEATTLE
BOSTON	CINCINNATI	DETROIT	NEW ORLEANS	ST. LOUIS	TULSA
BUFFALO	CLEVELAND	HOUSTON	NEW YORK	ST. PAUL	WASHINGTON
	DALLAS	KANSAS CITY	PHILADELPHIA	SAN FRANCISCO	

Branch Offices or Representatives in Principal Cities of Foreign Countries

Other Worthington Products:

PUMPS
Steam, Centrifugal, Power
CONDENSERS

DIESEL ENGINES
ROCK DRILLING EQUIPMENT
and Shop Accessories
CONTRACTORS AIR TOOLS

GAS ENGINES
FEEDWATER HEATERS
Stationary, Locomotive, Marine
REFRIGERATION EQUIPMENT

COMPRESSORS
Stationary and Portable
MULTI-V-DRIVES

M-65

WORTHINGTON-GAMON

CONVENTIONS—WHEN AND WHERE

(Figures in parentheses following the name of the convention city indicate the estimated attendance other than local)

JUNE 6-8.—LONG BEACH, N. Y. (1,000)
Conference of Mayors and Other Municipal Officials of the State of New York. Annual convention. Secretary, William P. Capes, City Hall, Albany, N. Y.

JUNE 7-9.—CANON CITY, COLO. (75)
Colorado Municipal League. Annual meeting. Secretary-Treasurer, Don C. Sowers, University of Colorado, Boulder, Colo.

JUNE 8-10.—CHICAGO, ILL.
American Federation of Arts. Annual convention. Secretary, Leila Mechlin, Barr Building, Farragut Square, Washington, D. C.

JUNE 8-10.—DETROIT, MICH. (300)
National Probation Association. Annual convention. General Secretary, Charles L. Chute, 450 Seventh Avenue, New York.

JUNE 9-10.—GREENWICH, CONN. (75)
New England Association of Commercial Executives. Annual meeting. Secretary, P. N. Hall, Chamber of Commerce, Westfield, Mass.

JUNE 9-10.—STATE COLLEGE, PA.
Pennsylvania Commercial Secretaries' Association. Annual meeting. Secretary-Treasurer, R. W. Crist, Chamber of Commerce, Harrisburg, Pa.

JUNE 11-17.—DETROIT, MICH. (4,500)
National Conference of Social Work and Affiliated Associations. Annual conference. General Secretary, Howard R. Knight, 82 North High Street, Columbus, Ohio.

JUNE 11-17.—DETROIT, MICH.
American Public Welfare Association. Annual conference held with National Conference of Social Work. Director, Frank Bane, 850 East 58th Street, Chicago, Ill.

JUNE 11-17.—DETROIT, MICH.
Association of Community Chests and Councils. Annual meeting held with National Conference of Social Work. Executive Director, Allen T. Burns, 1815 Graybar Building, New York.

JUNE 12-14.—CHICAGO, ILL. (200)
American Association of Museums. Annual meeting. Director, Laurence Vail Coleman, Smithsonian Institute, Washington, D. C.

JUNE 12-16.—CHICAGO, ILL. (1,200)
American Water Works Association. Annual convention. Secretary, Beekman C. Little, 29 West 39th Street, New York.

JUNE 12-14.—GALVESTON, TEXAS. (250)
City Marshals and Chiefs of Police Union of Texas. Annual convention. Secretary, George A. Smith, P. O. Box 299, Dallas, Texas.

JUNE 12-15.—BOSTON, MASS. (500)
National Association of Purchasing Agents. Annual convention and Informashow. Secretary-Treasurer, G. A. Renard, 11 Park Place, New York.

JUNE 12-17.—CHICAGO, ILL. (1,200)
National Association of Real Estate Boards. Annual convention. Executive Secretary, Herbert U. Nelson, 59 East Van Buren Street, Chicago, Ill.

JUNE 12-14.—TYLER, TEXAS.
Texas Commercial Executives' Association. Annual convention. Secretary, Carl A. Blasig, Brady, Texas.

JUNE 13-15.—CINCINNATI, OHIO.
Municipal Finance Officers' Association of the United States and Canada. Annual meeting. Executive Director, Carl H. Chatters, 850 East 58th Street, Chicago, Ill.

JUNE 15.—DETROIT, MICH.
Child Welfare League of America, Inc. Meeting with National Conference of Social Work. Executive Director, C. C. Carstens, 130 East 22d Street, New York.

JUNE 16-17.—LOUISVILLE, KY. (350)
American Automobile Association. Annual meeting. Executive Vice-President, Ernest N. Smith, Pennsylvania Avenue at 17th Street, Washington, D. C.

JUNE 19-21.—ST. JOHN, N. B. (300)
Canadian Public Health Association. Annual meeting. General Secretary, Dr. J. T. Phair, Spadina House, Toronto, Ont.

JUNE 19-20.—RACINE, WIS. (65)
Wisconsin Association of Commercial Secretaries. Annual meeting. Secretary-Treasurer, A. T. Sands, Eau Claire, Wis.

JUNE 20-22.—LEWISTON, MAINE. (800)
New England Association of Fire Chiefs. Annual convention. Secretary-Treasurer, John W. O'Hearn, 99 Main Street, Watertown 72, Mass.

JUNE 20-23.—CHICAGO, ILL. (300)
Smoke Prevention Association. Annual convention. Secretary, Frank A. Chambers, 1411 City Hall Square Building, Chicago, Ill.

JUNE 21-22.—GALESBURG, ILL. (60)
Illinois Association of Sanitary Districts. Annual meeting Secretary-Treasurer, G. H. Radebaugh, Urbana & Champaign Sanitary Districts, Urbana, Ill.

JUNE 21-23.—HIBBING, MINN. (400)
League of Minnesota Municipalities. Annual convention. Executive Secretary, Morris B. Lambie, University of Minnesota, Minneapolis, Minn.

JUNE 23.—TOLEDO, OHIO.
American Shore and Beach Preservation Association. Annual meeting. Secretary-Treasurer, Victor Gelineau, 1 Exchange Place, Jersey City, N. J.

JUNE 23-24.—HARRISBURG, PA. (300)
Eastern Association of Fire Chiefs. Annual convention. Secretary, F. E. Soule, Coatesville, Pa.

JUNE 23-24.—LAKE GEORGE, N. Y.
New York State Secretaries' Conference. Annual meeting. Secretary-Treasurer, Harold D. Leslie, Albany Chamber of Commerce, Albany, N. Y.

JUNE 26-30.—CHICAGO, ILL.
American Society for Testing Materials. Annual meeting. Secretary-Treasurer, C. L. Warwick, 1315 Spruce Street, Philadelphia, Pa.

JUNE 26-30.—CHICAGO, ILL. (1,500)
American Society of Mechanical Engineers. Semi-annual meeting. Secretary, C. W. Rice, 29 West 39th Street, New York.

JUNE 27-30.—CHICAGO, ILL.
American Society of Civil Engineers. Annual convention. Secretary, George T. Seabury, 33 West 39th Street, New York.

JUNE 27-29.—AMSTERDAM, N. Y. (150)
New York State Association of Chiefs of Police. Annual convention. Secretary-Treasurer, James L. Hyatt, 503 Western Avenue, Albany, N. Y.

JUNE 28-30.—WAUKESHA, WIS.
League of Wisconsin Municipalities. Annual convention. Secretary, Frederick MacMillin, 114 North Carroll Street, Madison, Wis.

JULY 1-7.—CHICAGO, ILL. (11,000)
National Education Association of the United States. Annual meeting. Secretary, J. W. Crabtree, 1201 16th Street, N. W., Washington, D. C.

JULY 10-12.—QUEBEC, QUE. (100)
Union of Canadian Municipalities. Annual convention. Secretary, Samuel Baker, City Clerk, London, Ont.

JULY 14-15.—CRAWFORDSVILLE, IND. (50)
Indiana Commercial Secretaries Organization. Annual meeting. Secretary, Glen B. Maple, Chamber of Commerce, La Porte, Ind.

JULY 25-27.—HARRISBURG, PA. (250)
Pennsylvania Chiefs of Police Association. Annual convention. Secretary, H. S. Carey, Altoona, Pa.

JULY 31—AUGUST 3.—CHICAGO, ILL. (700)
International Association of Chiefs of Police. Annual convention. Secretary, George Black, Chief of Police, Wilmington, Del.

AUGUST 15-17.—DECORAH, IOWA.
League of Iowa Municipalities. Annual meeting. Secretary-Treasurer, Frank G. Pierce, Marshalltown, Iowa.

AUGUST 21-27.—SAILING FROM CLEVELAND TO CHICAGO. (600)
International Association of Fire Chiefs. Annual convention. Secretary, James J. Mu'cahey, Yonkers, N. Y.

AUGUST 30—SEPTEMBER 1.—TORONTO, ONT. (200)
Ontario Municipal Association. Annual meeting. Secretary-Treasurer, H. L. Brittain, 137 Wellington Street W., Toronto, Ont.

SEPTEMBER 5-7.—STATE COLLEGE, PA. (130)
Pennsylvania Sewage Works Association. Annual meeting. Secretary, L. D. Matter, Kirby Health Center, Wilkes-Barre, Pa.

SEPTEMBER 7-8.—NEW YORK. (200)
National Shade Tree Conference. Secretary-Treasurer, Dr. Rush P. Marshall, Yale University, New Haven, Conn.

SEPTEMBER 7-9.—STATE COLLEGE, PA. (200)
Pennsylvania Water Works Operators' Association. Annual convention. Secretary-Treasurer, I. M. Glace, 506 South Office Building, State Capitol, Harrisburg, Pa.

SEPTEMBER 17-20.—CHICAGO, ILL. (350)
American Institute of Park Executives and the American Park Society. Annual convention. Executive Secretary, William H. Walker, 2234 Inglewood Place, South Bend, Ind.

SEPTEMBER 18-20.—CHICAGO, ILL.
International City Managers' Association. Annual convention. Executive Director, Clarence E. Ridley, 923 East 60th Street, Chicago, Ill.

SEPTEMBER 21-23.—MILWAUKEE, WIS.
International Association of Public Works Officials. Annual convention. Secretary, A. M. Anderson, 100 North La Salle Street, Chicago, Ill.

SEPTEMBER 24-27.—NEW YORK.
National Association of Commercial Organization Secretaries. Annual convention. Secretary-Treasurer, C. M. Anderson, Chamber of Commerce, Memphis, Tenn.

SEPTEMBER 25-27.—MILWAUKEE, WIS.
American Society of Municipal Engineers. Annual convention. Secretary, C. W. S. Sammelman, 4359 Lindell Boulevard, St. Louis, Mo.

SEPTEMBER 25-27.—MILWAUKEE, WIS.
American Water Works Association—Wisconsin Section. Annual convention. Secretary, L. A. Smith, City Hall, Madison, Wis.

SEPTEMBER 26-29.—WILKES-BARRE, PA.
International Association of Municipal Electricians. Annual convention. Secretary, W. H. Harth, Columbia, S. C.

OCTOBER 2-6.—ATLANTIC CITY, N. J. (600)
National Recreation Association. Annual congress. Administrative Secretary, Thomas E. Rivers, 315 Fourth Avenue, New York.

OCTOBER 2-6.—CHICAGO, ILL. (3,000)
National Safety Council. Annual congress. Managing Director, W. H. Cameron, 20 North Wacker Drive, Chicago, Ill.

OCTOBER 9-12.—INDIANAPOLIS, IND.
American Public Health Association. Annual meeting. Executive Secretary, Dr. Kendall Emerson, 450 Seventh Avenue, New York.

OCTOBER 16-19.—OKLAHOMA CITY, OKLA. (350)
Southwest Water Works Association. Annual convention. Secretary-Treasurer, Lewis A. Quigley, Fort Worth, Texas.

OCTOBER 16-18.—HARLINGEN, TEXAS. (300)
League of Texas Municipalities. Annual convention. Executive Secretary, Harvey W. Draper, 319 Kress Building, Houston, Texas.

OCTOBER 20-24.—OAKLAND, CALIF.
American Water Works Association—California Section. Annual convention. Secretary-Treasurer, R. F. Brown, P. O. Box 506, Stockton, Calif.

OCTOBER 26-28.—ST. LOUIS, MO. (100)
American Water Works Association—Missouri Valley Section. Annual meeting. Secretary, Earl L. Waterman, University of Iowa, Iowa City, Iowa.

NOVEMBER 6-8.—STATESVILLE, N. C.
American Water Works Association—North Carolina Section. Annual meeting. Secretary, Professor H. G. Baity, University of North Carolina, Chapel Hill, N. C.

NOVEMBER 8.—ATLANTIC CITY, N. J.
Governmental Research Association. Secretary-Treasurer, Robert M. Paige, Drexel Avenue and 58th Street, Chicago, Ill.

EACH PASSING YEAR ADDS LUSTRE *to the* SERVICE RECORD *of* BRICK PAVEMENT

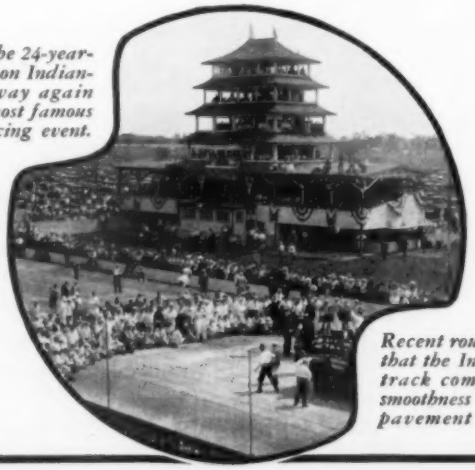
• During the passing years, new thoughts and theories are tested in the laboratories of time. Now we are reviewing the results of these tests along many lines.

In the field of paving it is easy to observe the soundness of the nation's good-roads policy, and the homely truth that the most lasting pavements are by far the cheapest in the end.

More than 40 years old, a brick pavement in each of several communities is serving with complete satisfaction to its owners. Those being laid today are, structurally, far better pavements. In the future as in the past, each passing year will add lustre to their service record and bring satisfaction to those who use and pay for them.

For further information write National Paving Brick Association, 1245 National Press Building, Washington, D. C.

On May 30th, 1933, the 24-year-old brick resurface job on Indianapolis Motor Speedway again carried the world's most famous international auto racing event.



Recent roughometer tests show that the Indianapolis Speedway track compares favorably in smoothness with the average city pavement in good condition.

RESURFACE with BRICK

NEWS AND ILLUSTRATIONS

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

Swimming Pool Sanitation

There are six major points of sanitation routine for the care of swimming pools. In each of these The Mathieson Alkali Works, Inc., 250 Park Avenue, New York, calls attention to the value of H T H, which is a uniform free-flowing powder containing 65 per cent of available chlorine and packed in sealed 4-pound cans, enabling it to retain its full strength for months, even in hot weather. H T H dissolves easily to form hypochlorite solutions high in germ-killing power.

In the chlorination of swimming pool water H T H may be used for regular chlorination or for emergency at peak loads where other water disinfection equipment is used. H T H may be made up into germ-killing and deodorizing solutions for floors, diving boards and walkways. It may be used in laundries for sterilizing and bleaching towels and sterilizing suits. It is convenient and effective for use when cleaning pools and for seasonal algae problems. PH-Plus, a new Mathieson product, makes pool sanitation easier by proper control of the alkalinity.

The new H T H footbath has been especially designed by Mathieson engineers to add to the effectiveness with which H T H solutions protect against athlete's foot. It holds the most economical amount of solution necessary to insure protection. It has anti-splash and anti-slip features, is 30 inches square, 4 inches high and weighs 39 pounds. It holds 6 gallons of solution, 2 inches deep. It is made of green, flexible rubber, molded in one piece, with an anti-slip bottom tread on the inside, and an anti-slip suction groove on the under surface, and rounded, anti-splash side walls; hence there is nothing to break, nothing to corrode, nothing to leak.

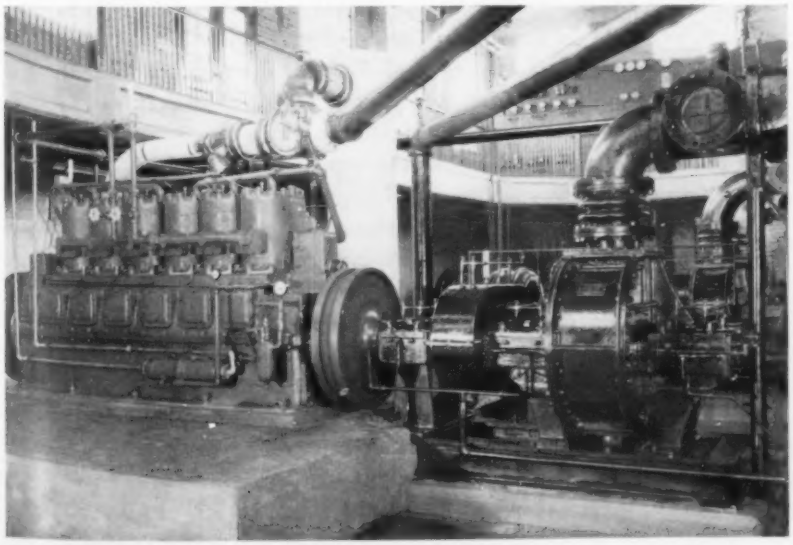
Reflecting Safety Zone Signals

Safety zone markers which do not require an electric lighting installation have been placed on the market by the Copalite Reflecting Signal Co., Ltd., Phelan Building, San Francisco, Calif. These Copalite safety zone markers are made in one unit covering the entire width of the safety zone and are fastened to the street with three lag screws and long shields. They are so designed that they are not damaged by the heaviest trucks running over them. Copalite safety zone markers are made of Alcoa heat-treated aluminum alloy similar to that used by the U. S. Army and Navy in the fighting ships of the air and the sea. This material develops a high tensile strength and has sufficient ductility to absorb the hardest service conditions.

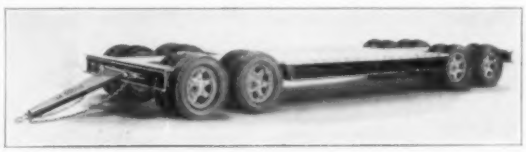
The markers have five yellow or red reflectors of selenium glass covering the full width of the zone. It is not necessary to remove a zone to change reflectors. All that is needed is to remove one screw and slip in a new reflector. Upon approaching a safety zone, the headlights of an automobile give the warning from the reflecting panels of the Copalite safety zone by throwing a beam of red light that can be seen for a distance of 300 feet.

Large Gas Engine Run on Sewage Sludge Gas

The accompanying illustration shows a large gas engine operating on sewage sludge gas, direct-connected to an R-C-W rotary positive blower at the sewage disposal plant of the Springfield, Ill., Sanitary District. W. B. Walraven, engineer, who has advocated the use of sewage gas for power production instead of for plant heating, which is a common practice, stated before the Illinois Association of Sanitary Districts and the Central States Sewage Works Association at Rockford, Ill., in May, 1932: "The difference between $10,000 and $1,700 represents the gross annual saving by utilizing 50,000 cubic feet of gas daily as fuel for a combustion engine instead of burning it in a furnace. From this must be deducted the several operations and carrying charges in order to arrive at the saving which may be effected. A later discussion on the subject of heat recovery from a gas engine points out the possibility of a still greater annual saving." The R-C-W rotary positive blower was made by the Roots-Connersville-Wilbraham Co., Connersville, Ind.



THE R-C-W ROTARY BLOWER AT THE SPRINGFIELD, ILL., SANITARY DISTRICT SEWAGE DISPOSAL PLANT



THE NEW LA CROSSE TRAILER

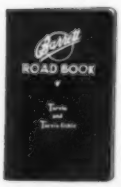
A New Tandem Axle Machinery Trailer

A new tandem axle LaCrosse trailer which retains all the fully reversible advantages of the regular dual axle models has been announced by the C. R. Jahn Co., Builders Building, Chicago, Ill. The new design conforms to the axle load limits and trailer width regulations of most states. The trailer is under 8 feet in over-all width, is mounted on pneumatic tires and is built in sizes up to 72,000 pounds capacity. It is fully reversible and can be towed from either end, thus eliminating the delays often made necessary by maneuvering to get in position or in turning around. Dual end steering makes it follow the turning radius of the truck and eliminates the dangers in swinging wide on the curves. Braking at both ends assures full control at all times. The wheels roll on heavy-duty Timken bearings, and the platform is supported by a series of heavy freight-car type coil springs, a feature which permits the wheels to follow the contour of the road surface without disturbing the level of the loading platform. The loading platform is flat, and no excess weight is wasted in providing for heavy steering turntables.

Barrett Tarvia

GOOD ROADS at LOW COST

Canton Street, Stoughton, Mass. Tarvia "Re-Tread," 1930



The new Barrett Road Book containing useful tables and information on the proper use of Tarvia and Tarvia-lithic is available to highway engineers, contractors and road builders. Ask the Tarvia field man for your copy, or write our nearest office.

The Barrett Company

New York	Chicago	Philadelphia
St. Louis	Minneapolis	Hartford
Detroit	Cleveland	Boston
Buffalo	Columbus	Milwaukee
Providence	Syracuse	Birmingham
Lebanon	Toledo	Cincinnati
Baltimore	Youngstown	Bethlehem
Rochester		Portland, Me.

THE BARRETT COMPANY, Ltd.
Montreal Toronto Winnipeg Vancouver

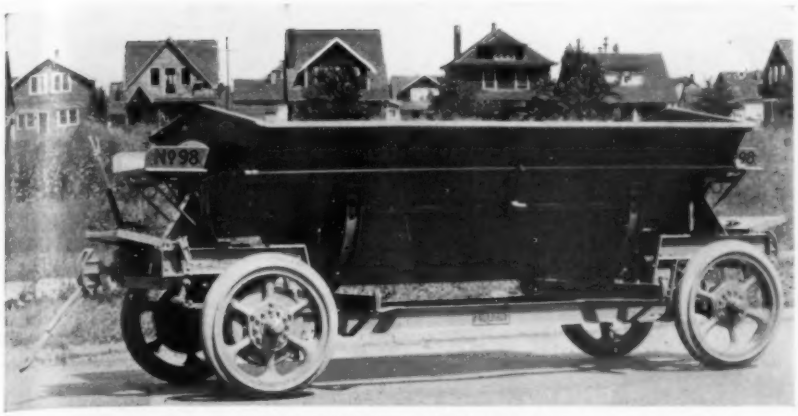
TAR is a complex compound, and its qualities differ widely. Varying conditions of production change its efficiency for certain uses.

But Tarvia is always uniform—dependable. Barrett draws its crudes from many sources, carefully classifies and grades them, and refines Tarvia exactly suited to the purpose for which it is to be used. The Tarvia Barrett offers to meet user's specifications must first of all meet our own more rigid, self-imposed specifications.

This sort of manufacturing integrity plus Barrett's unmatched facilities for dependable deliveries and improved application constitute *plus values* which experienced road engineers appreciate in Tarvia. It is assurance to them that the Tarvia road they build will be smooth, easy-riding, non-skid—that it will be easy and economical to build—and that it will give many years of low-cost, trouble-free service.

The paving experience of The Barrett Company, America's oldest and most experienced manufacturer of coal-tar road-building materials, is available to you through the Tarvia field man. 'Phone, wire or write our nearest office.

When you write for that catalog, kindly mention THE AMERICAN CITY



ONE OF THE FRUEHAUF GARBAGE COLLECTION TRAILERS USED BY THE CITY OF COLUMBUS

Reducing Refuse Collection and Haulage Costs

The collection and haulage of city refuse, ashes, snow and other waste materials presents an ever increasing problem to city officials. With the rapid expansion of growing cities, there occurs a diminishing number of available "short haul fills." Long hauls are necessary. There is a constantly increasing tonnage of waste materials to be handled, and traditional handling methods must be cast aside. After studying and analyzing such conditions, the Fruehauf Trailer Co., Detroit, Mich., has developed a low-cost haulage system using trailers, either horse- or tractor-drawn, for collection.

House-to-house collection is an interrupted loading-up process. For this reason, actual operations have shown that horse-drawn trailers may be used for collection with the motor truck for hauling to points of disposal. In making the house-to-house collection with the horse-drawn Fruehauf trailer, the load is completed and pulled to a central collection point in the district. At this point, the driver unhitches the load, picks up a waiting empty trailer, and goes on collecting his next load. This operation continues throughout the day. The collectors are thus able to devote their entire time to loading, losing no time on hauls to disposal locations.

The crew of the "trains" of 2 to 4 loaded trailers consist of but two men, a driver and a helper, the helper riding on the last trailer and acting as signalman or brakeman.

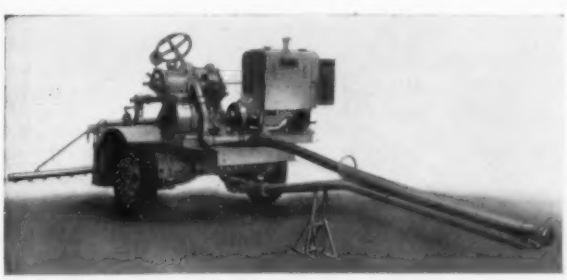
The Fruehauf body is of the gravity dump type, made to dump at either side. It is held in place by positive locks on both ends of the trailer and is released for dumping by a hand lever located on the opposite side. The levers are located at the center of the body on each side. The chassis is equipped with an A frame at each end, having two horizontal shock-absorbing springs, which take up all lost motion in the body, when in an upright position. This lock eliminates the necessity for side chains. The body is held in place on the chassis during the dumping operation by two large snubber chains attached to the opposite side of the chassis from which the load is being discharged. The entire load is discharged at each dumping operation. The body is returned to loading position quickly and with little effort, and the lock is engaged automatically and secured in place by the operator.

A Cart Type Bituminous Distributor

The cart type of bituminous distributor has attracted considerable attention, for it enables a municipality or a contractor to use plain tanks for hauling bituminous materials and then couple up with the cart type distributor for application of the material to the road.

A new bituminous Applicator of this type announced by the Rosco Manufacturing Co., 928 South Fourth Street, Minneapolis, Minn., retains the features of standard Rosco distributors such as the 7-way valve, the folding spray bar, and pressure control. A special feature of the applicator is the Rosco leveling device which enables the operator on the rear platform to quickly and easily regulate the height of the spray bar to conform immediately to the changes that take place when hooking up to various sizes of trucks operating on the same job. This leveling device is controlled by a hand wheel within easy reach of the Applicator operator. The machine is recommended only for road oils, cutbacks and emulsions, the standard units with burners and insulated tanks being recommended for heavy penetration materials.

The Rosco Applicator is powered with a 4-cylinder radiator-cooled engine and has a rotary, internal gear type pump. It has a steering device similar to that of a construction grader, which permits offsetting the trailer 6 feet, center to center, but keeps the spray bar always transverse to the road. In this way the trucks may travel on the hard center of the road, allowing the Applicator to work on the soft shoulders or in the loose material.



THE ROSCO BITUMINOUS APPLICATOR

Measuring Chemical Solutions

The proper amount of chemical solution to apply in the treatment of water depends upon the rate of flow of the water itself; thus it is in direct ratio at all times. Proportioneers, Inc., Room 307, 737 North Michigan Boulevard, Chicago, Ill., has developed an inexpensive device called Tret-O-Unit which handles this proportioning problem readily. The pressure of the water itself is the actuating force for the Tret-O-Unit pump, and the water flows through a standard meter which has no other function than to meter the total quantity and to govern the movement of the Tret-O-Unit pilot valve. This permits the power obtained from the water to be applied to pumping the chemical into the main pipe line. The power required is negligible, thereby maintaining the accuracy of the meter.

A TRIDENT CREST METER USED AS THE FLOW RESPONSIVE DEVICE FOR A TRFT-O-UNIT PUMP

The Tret-O-Unit measures the proper percentage of chemical, builds it up to the necessary pressure, and injects it into the untreated water at any point in the main line below the meter or ahead of it. The chemical injection can be readily changed in small increments from minimum to maximum capacity by a special stroke-length adjustment. When once set by the operator, the ratio of chemical in-put to water flow rate remains constant. Tret-O-Units are obtainable in a wide variety of capacities, owing to interchangeability of cylinder sizes.

The
LEADING CHOICE
of leading firms for
LOWEST TRANSPORTATION COSTS

THE CAMELS ARE COMING
by Chevrolet

It's getting more and more noticeable every day—this trend to Chevrolet on the part of leading national firms. Stand on any street-corner, and you can't help being conscious of it: Coupes . . . sedan deliveries . . . stake trucks . . . expresses—one continuous procession of them, with Chevrolet emblems on the radiators, and equally famous emblems on the sides!

Chevrolet is extremely proud of this trend, especially since it comes in dollar-saving days like these. For Chevrolet feels, and you'll probably agree, that the best compliment a car or a truck could be paid is to have leading firms buy it—*and come back for more.* And that is exactly what's taking place in the automotive industry right now.

Do you know why? Because Chevrolet is the only builder of low-priced transportation offering that unbeatable combination: *Six Cylinders! Overhead Valves!* Because Chevrolet does such an excellent job of building quality and stamina into its cars and trucks; they stand up so well, last such a long time, give so little trouble. Finally, because Chevrolet Sixes operate for less money. The cost records of one firm after another prove definitely that in gas, oil, upkeep and repairs, *the most economical car or truck you can buy is a Chevrolet!*

CHEVROLET MOTOR COMPANY, DETROIT, MICHIGAN

• • •

Illustrated is the Chevrolet Sedan Delivery, $545. Chevrolet trucks priced as low as $440. Chevrolet passenger cars priced as low as $445. Prices f. o. b. Flint, Michigan. Special equipment extra. Low delivered prices and easy G. M. A. C. terms. A General Motors Value.

PASSENGER CARS **CHEVROLET** COMMERCIAL CARS

Mention THE AMERICAN CITY—it helps.

A STONE SPREADER WITHOUT MOVING PARTS

A New Stone Spreader

A spreader for sand, slag, salt, calcium chloride, chips, gravel, cinders and stone, which spreads these materials uniformly to a width of 9 feet, has been announced by D. C. Elphinstone, Inc., 115 South Calvert Street, Baltimore, Md. The Best spreader consists of a series of troughs made of 14-gage metal, the sides of which are 2 inches high, the combined bottoms forming a flat, fan-shaped surface spreading the aggregate from the tail end of a dump truck. The front end, which attaches to the truck, is 6 feet wide, and the back or discharge end is 8½ feet wide; the length is 2½ feet. The spreader weighs 235 pounds, including two 5-foot back-end hanging chains by means of which the spreader is suspended from the back of the truck.

In operation, as the body is elevated and the tailgate opened, the material flows by gravity down the troughs and is discharged in a smooth sheet 9 feet wide. The number of pounds of material per square yard of road surface to be spread is governed entirely by the width of the tailgate opening and the speed of the truck, and can be varied to suit all conditions. The spreader can be installed by two men in two minutes, and has no moving parts.

Diesel Engines from 250 to 1,000 Hp

Recently the Nordberg Manufacturing Co., Milwaukee, Wis., well known for its large-size diesel engines operating on the two-cycle principle, has announced a new line of diesels in sizes varying from 250 to 1,000 horsepower, and of the four-cycle type arranged for mechanical injection and of trunk piston construction. In appearance these engines present a radical departure from other designs in that they are completely enclosed even at the top. The only moving part to be seen is the flywheel.

Individual fuel pumps are provided for each cylinder and are located back of the covers on the front of the engine. These pumps are mounted to the cylinder block and are set directly over the cam shaft and adjacent to the cylinder which they serve. The governor, located at the flywheel end, is gear-driven from the crankshaft and is also completely enclosed. A synchronizing device, arranged for both hand and motor regulation, is provided for parallel operation. Complete systems of piping are attached to the engine for cooling water, starting air, fuel and lubricating oils and exhaust. All the incoming air to the engine is passed through air filters set in the upper covers on the exhaust side of the engine. Other built-in features include a fuel transfer pump for delivering fuel oil from the service tank to the header, a pressure strainer and cooler for lubricating oil, and a fuel oil filter. Mounted on the end of the engine is the gage board for the necessary pressure gages for air, oil and water.

Washington, D. C., Places Order for Traffic Control Equipment

The District of Columbia recently awarded a contract to the Trafilator Corporation, Staunton, Va., licensee of the Miller Train Control Corporation, for demand signal equipment for fifteen intersections, consisting of thirty-seven vehicle detectors and fifteen control units. The city of Washington made its first installation of this type of traffic signals abount eighteen months ago, and this large order indicates the growing popularity of the new system.

The Trafilator Corporation has recently furnished Trafilator equipment to the city of New York which is now in operation on Pelham Parkway at the intersection of the cross street between the Botanical and Zoological Gardens.

A New Clearly Visible Highway Guard

A safety highway guard which is highly visible and thus of itself prevents many accidents, and which when it is struck by a vehicle is strong enough to prevent the car or truck from breaking through and resilient enough to soften the shock of the impact, is being made by the Pittsburgh Steel Co., Pittsburgh, Pa. This Pittsburgh safety highway guard is a 14-inch band woven under tension from spring steel wire of high tensile strength with an elastic limit equal to approximately 95 per cent of its ultimate strength. The guard develops under test a total breaking strength of more than 50 tons.

The method of fabricating the high elastic limit wire produces a band of sufficient resilience to absorb shocks from impact without damage to the guard or to the vehicle. The guard is placed at a position on the posts so that the bumper or wheels of a car leaving the highway will strike the guard and be deflected back toward the highway without striking the posts.

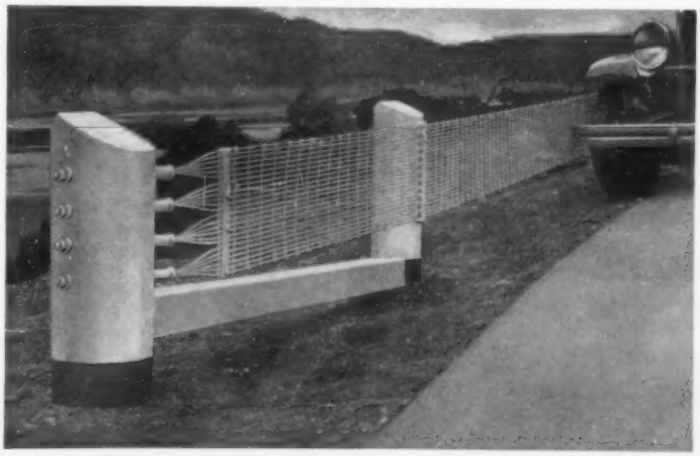
The visibility of the guard is due to its width and to the heavy zinc-coated finish. It can be painted white or checkered black and white to increase the visibility further if desired. It is easily erected and can be readily handled by the regular highway maintenance crew. The guard is manufactured in standard rolls of 500 lineal feet, and is mounted on posts of either steel or wood placed 16 feet on center. The clamps to attach the guard band to the posts are designed to allow free movement of the band and thus distribute the impact of shocks.

Klauder to Make Survey of Municipal Lighting Plants

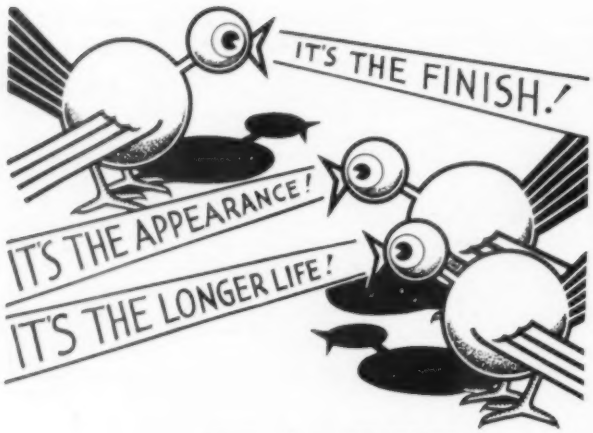
Binghamton, N. Y., has authorized an engineering survey to be made by Louis T. Klauder, consulting engineer, Philadelphia, Pa., to ascertain the possibilities of establishing a municipal lighting plant. Mr. Klauder directed the development of the municipal plants at Jamestown, N. Y., and Hagerstown, Md. It is the desire of the Binghamton officials to determine the possibilities of operating a municipal plant for street and municipal building lighting in conjunction with the city pumping station.

The possibilities of municipalities operating street lighting systems in conjunction with their local water service without the necessity of additional administrating staff has greatly increased the interest of progressive municipalities in local lighting possibilities. It is found that where municipalities have control of their water supply and municipal lighting systems, the ability to further provide central heating with such services, particularly when central steam plants are located adjacent to the business district, is being more generally considered.

The success of Mr. Klauder's organization and the necessity of meeting the increased assignments and interest on the part of the municipalities has resulted in its recent removal to more attractive and convenient offices in the recently constructed Lincoln-Liberty Building at One South Broad St., Philadelphia, Pa.



AN INSTALLATION OF PITTSBURGH SAFETY GUARD RAIL



...EACH
chirps a different song
but ALL THREE ARE NECESSARY

Officials entrusted with the responsibility of purchasing street signs, highway markers, lockers, toilet partitions, portable shower baths, hospital equipment and other sheet steel products are subjected to a barrage of sales arguments. One salesman stresses finish, another appearance and still another, long life. Each feature is important and *products made of Superior Galvannealed* combine them all.

Signs made from Superior Galvannealed resist rust better, take the finish better and undergo forming and embossing better.

We shall be glad to put you in touch with a manufacturer who can supply your products made from this *improved steel sheet.*

THE SUPERIOR SHEET STEEL CO.
Canton, Ohio
Division of Continental Steel Corporation

SCHOOL ZONE

- Superior Galvannealed is a special analysis steel sheet.
- A hot dip, heat-treated zinc coating is *bonded* to the base metal, making it highly rust-resisting.
- Etched surface adapted to receive any finish. The coating will not peel under difficult forming or embossing.

Superior Galvannealed
PATENTED PROCESS

SPEED TRAFFIC SAFELY *with* Duers Automatic Traffic Whistle

Easily attached to your present traffic signal system, the DUERS Whistle sounds exactly like a policeman's whistle. Its clear, sharp blast as the amber light comes on makes both driver and pedestrian more alert, and speeds up the traffic both in starting and stopping.

"A notable advance in automatic traffic control," say leading traffic engineers.

Write for illustrated booklet

DUERS SIGNAL CO. Inc.
GLENS FALLS, NEW YORK

SINCE 1867
COLDWELL

Above: Coldwell "L-Twin" motor lawn Mower and roller. Mows and rolls simultaneously 4 to 6 acres a day on one gallon of gasoline. With gang units attached it cuts a 60-inch swath, ten acres per day on one gallon of gasoline.

A Dependable and Economical Power Lawn Mower Is Bound to Be Satisfactory

THE Coldwell Power Lawn Mowers and Rollers perform the two operations simultaneously which cut the cost and produce finer results.

The Twin cylinder motors deliver an abundance of power for all cutting conditions and provide large capacity mowing at small expense.

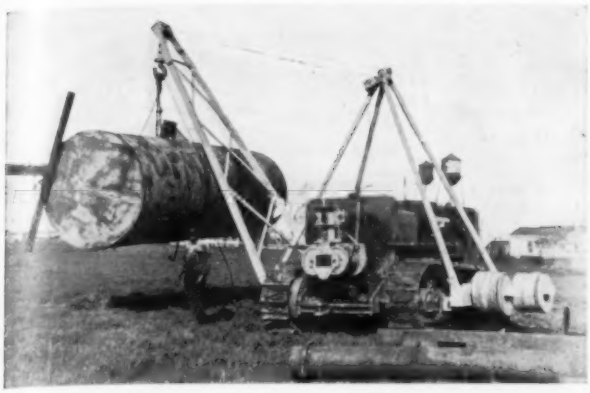
Sturdy but simple construction throughout insures dependable performance.

There's a style and size suited for any type of lawn.

Sales and Service facilities in all principal localities.

Full particulars on request.

COLDWELL LAWN MOWER CO., NEWBURGH, N. Y., U. S. A.
In Canada—Taylor-Forbes Co., Ltd., Guelph
Manufacturers of DEPENDABLE *Lawn Mowers* — HAND, HORSE, GASOLINE, ELECTRIC



A LETOURNEAU TRACTOR-DERRICK AT WORK IN THE FIELD

A Tractor Derrick for Handling Materials in Yards and Depots

A new tractor-derrick for lifting or moving materials and equipment of all kinds in the field, in city yards and in storage depots has been announced by R. G. LeTourneau, Inc., Stockton, Calif. The machine is intended for use in piling, loading, unloading, moving and handling equipment and supplies, for laying pipe lines of all kinds, ripping up abandoned street-car tracks, setting or removing poles, erecting small and medium bridge members and other structural steel, placing and moving elevated transformers, and in general performing all the functions of a light locomotive crane.

The boom can be dismounted from the tractor-frame by removing two hinge pins, and the tractor-frame can be removed from the tractor by loosening six bolts. It is not necessary, however, to remove the tractor-frame in order to use the tractor for other work, and the tractor can be used for hauling while the entire derrick is mounted on it. About 20 minutes is required to dismount the derrick.

The tractor derrick is operated by the regular double-drum LeTourneau power control unit, one drum raising or lowering the boom, and the other the fall line. The regular tractor operator controls the derrick with the normal control levers of the power unit. Although light in weight, the derrick is strongly constructed. Its rated maximum lift is 10,000 pounds. It is of welded steel construction throughout, and all sheaves are carried on high-duty Hyatt roller bearings. It can be taken practically anywhere a tractor can go, and may be operated wherever a tractor can get fairly solid footing. With the addition of a hammer and guide, it can be used as a pile driver.

A Synthetic Resin for Street Signs

A resinous substance called Catalin, a new material in modern industry which combines sparkle and luster with the toughness and strength of metal, has been developed by the American Catalin Corporation, 230 Park Avenue, New York. Catalin is not a molded product, but a cast synthetic resin, which is furnished in solid sheets or special castings, and requires no seasoning. It is non-inflammable, odorless, tasteless, non-porous, and practically moisture-proof, resists alcohol, oils and all common acids, has a high dielectric, tensile and compressive strength, and holds its shape and color. This material has been used for many purposes, among which is its use in street signs, for it can be filed, sawed, ground, drilled, tapped, slotted, stamped, embossed, and put through other processes, and polishes and finishes to a permanent high luster.

New Worthington Headquarters

The Worthington Pump & Machinery Corporation, Harrison, N. J., has recently opened its new office building adjacent to the corporation's plant at Harrison, N. J. The general and executive offices, formerly situated at 2 Park Avenue, New York, have been moved to the new location for better coordination with manufacturing and sales operations. The local sales office will, however, be continued at 2 Park Avenue.

A New Emulsion and Cold Patch Pump

A small pumping unit for applying cold patch and asphalt emulsion directly from the drums to the road under pressure has recently been produced by the Kinney Manufacturing Co., 3529-3541 Washington Street, Boston, Mass. This unit consists of a Kinney pump with a capacity of 10 gallons per minute especially designed for pumping emulsion. A strainer is provided on the suction side of the pump, which is driven by a 1½-horsepower air-cooled gasoline engine with a spur gear speed reducer and a rear guard. The pump and the engine are connected through a Kinney disc actuated spiral clutch. Suction hose, patching hose, spray nozzle and shut-off cock and relief valve are supplied with the unit.

The total weight is only 220 pounds, making it easily possible for two men to place it on a truck or trailer. A typical unit consists of a light truck or trailer with five or six drums of material. The plugs are taken off the end of the drum, the suction hose inserted and the material applied to the road under pressure. One of these units will apply six drums of material in about 35 minutes. Considerable material is saved as compared with hand pouring, the material is applied more evenly under pressure, and work progresses approximately six times as fast as when hand pumps are used.

Personnel at Boulder Canyon

In the May issue of THE AMERICAN CITY appeared the article, "The Water Supply for Boulder City, Nevada," by W. R. Nelson, Assistant Engineer, Boulder Canyon Project, U. S. Bureau of Reclamation. At the request of the Commissioner, Bureau of Reclamation, we wish to add the following information, which was received too late to be included with the original article:

"The public utilities and improvements in Boulder City, the construction and operation camp for the Boulder Canyon project, have been built by the Bureau of Reclamation of the Department of the Interior. Dr. Elwood Mead is Commissioner and administrative head of the Bureau of Reclamation, R. F. Walter is Chief Engineer in charge of all designs and construction under the Bureau of Reclamation, and Construction Engineer Walker R. Young represents the Chief Engineer in charge of project construction."

New Works Manager for Meter Factory

The Pittsburgh Equitable Meter Co., 400 Lexington Avenue, Homewood, Pittsburgh, Pa., has recently announced the appointment of Walter Parker as Works Manager of the Liquid Meter Division. Mr. Parker, who has been Chief Engineer of the Liquid Meter Division, has had extensive experience in designing and building meters and allied equipment for the water and petroleum industries. He was formerly associated with the Fry Pump Co., and is a graduate of the Mechanical Engineering School of the North Carolina State University.

A KINNEY EMULSION SPRAYER IN USE BY THE MASSACHUSETTS STATE HIGHWAY DEPARTMENT

THE MARCH OF CRIME — STOPPED!

Dramatic but all too common headlines in the day's news. Theft, property damage and petty pilfering crowd the columns of our papers. These things can happen to you, just as they have happened to hundreds of others.

How can you guard against it? The answer lies largely through prevention—by the positive protection of property — by impassable and dependable Cyclone Fence.

Economical because of its reasonable price and the elimination of maintenance costs. In other words—this ever-alert guardian is not an expense—but a dividend-paying investment.

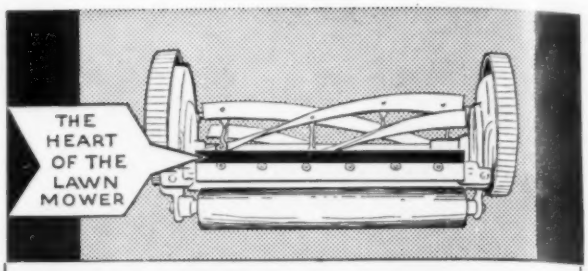
Cyclone Fence is made of copper steel and heavily galvanized after fabrication to resist rust. Available in a variety of styles—and quickly erected by factory-trained men if you desire.

Write for complete information. Address Dept. A.M.

CYCLONE FENCE CO.
General Offices: Waukegan, Ill.
Branches in principal cities
SUBSIDIARY OF UNITED STATES STEEL CORPORATION
Pacific Coast Division
STANDARD FENCE COMPANY
Oakland, Calif.

Cyclone—not a "type" of fence—but fence made exclusively by Cyclone Fence Company and identified by this trademark.

Cyclone Fence
REG. U.S. PAT. OFF.



is—the Cutting Blade!

The BRUNITE *offers:*

a blade of special processed Swedish steel that is designed to insure **a lasting keen cutting edge;**
in sizes to fit any type or size of hand or power mower;
guaranteed to render five years of satisfactory service;

Now used and endorsed by the U. S. Government at Washington, the Arlington Cemetery at Washington, D. C., the cities of Toledo, Cleveland, Syracuse, and many others.

Keep your parks and public grounds beautiful with the blade that **cuts** the grass instead of **tearing** it. The BRUNITE blade is easy to install, and there's no after expense for sharpening. **Write for prices.**

The Miller Power Lawn Mower Co.
Manufacturers of
POWER LAWN MOWERS AND ROLLERS
6662 Pearl Road Cleveland, Ohio

KILL WEEDS WITH A SPRINKLER . . .

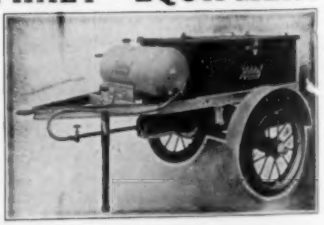
filled with Dolge Weed Killer. New super-strength formula hits the roots, kills completely. One application will rid drives, walks, tennis courts, playgrounds of weeds, for a season at a cost of less than 7c per 100 square feet. Effective on poison ivy and other rank growths.

Saves time, labor, money. Write for details and free lease offer on all-steel sprinkling cart.

THE C. B. DOLGE COMPANY, WESTPORT, CONN.

FOR ECONOMICAL MAINTENANCE USE HOTSTUF ASPHALT EQUIPMENT

SAVE { TIME / LABOR / FUEL / MATERIAL



Write for Catalog

Dealers in Principal Cities

MOHAWK ASPHALT HEATER CO.
Frankfort New York

Pumping Equipment at A Century of Progress Exposition

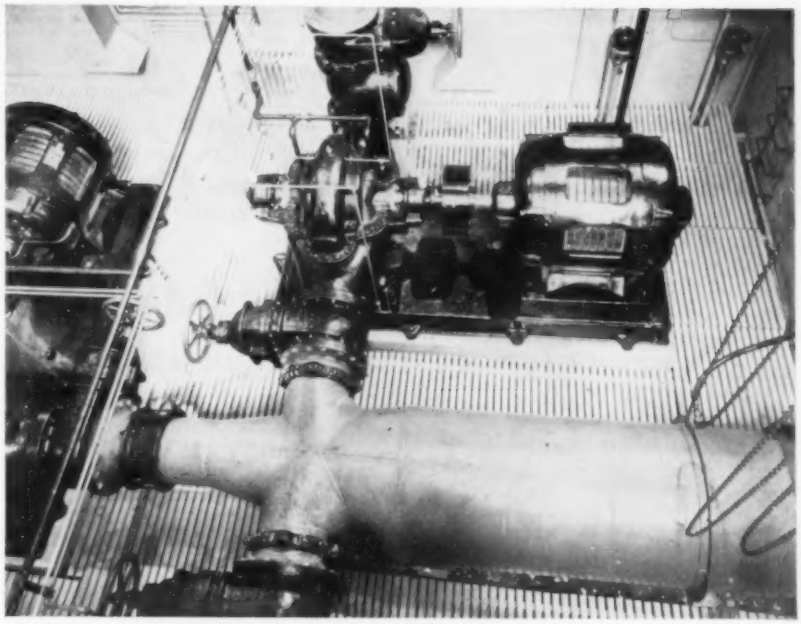
Interest in the various types of equipment which are being used at A Century of Progress Exposition in Chicago has been shown on all sides. Municipal officials are particularly interested in the equipment installed that is of the type used in municipalities. The Worthington Pump & Machinery Corporation, Harrison, N. J., reports that for the general water-supply and fire service three Worthington 14-LA-4 horizontal centrifugal pumps, each direct-connected to a 400-horsepower motor, and each unit having a capacity of 10,000,000 gallons per 24 hours, discharging against a head equivalent to 195 feet, have been installed. Further, for the lagoon pumps three Worthington 6-L-3 horizontal centrifugal pumps, each direct-connected to a 75-horsepower motor, and each unit discharging 1,200 gpm against a 175-foot head, and one Worthington 6-L-3 horizontal centrifugal pump, direct connected to a 25-horsepower motor, and having a capacity of 1,325 gpm against a head of 60 feet, have been installed. These four pumps will supply the water for the fountains located in the lagoon. In all the large buildings on the grounds, the water will be metered by Worthington water meters.

The pumping station itself is a well-built structure extending two stories below ground level and is on the same property lot as the Illinois Central Depot. On the main or lower floor, three 10 mgd Worthington pumps are located, it being necessary to place them about 40 feet below ground level in order to get within the suction lift of the suction tunnel. Water is taken from this water tunnel, which is owned by the city and which extends a mile or more into the lake through a suction crib. Water flows from the crib through the tunnel about a mile into the city west of the lake shore where three city of Chicago pumping stations are located, each of which takes suction from this tunnel.

On the second floor, or gallery, of the pump house are located the meters, control board, priming pumps, chlorinator and other small apparatus. In the lagoon are the four "Towers of Water and Light." These towers are equipped with colored lights which shine through the water and present a beautiful picture at night. In the foundations of each of these towers are the lagoon pumps mentioned above.

Yeomans Bros., 1433 Dayton Street, Chicago, Ill., were awarded the contract for supplying Yeomans pumps for several sanitary sewage pumping stations located in the Fair Grounds. In addition to installing and operating these pumps, Yeomans will operate the Worthington pumps for the domestic and fire services. It is expected that both the water and sewer systems will operate for at least one year 24 hours a day. Complete engineering personnel will be on duty.

J. J. Fenolia, Sales Representative, Worthington Pump and Machinery Corporation, 400 West Madison Street, Chicago, Ill., was responsible for the Worthington installations.



ONE OF THE PUMPING STATIONS IN A CENTURY OF PROGRESS EXPOSITION, AT CHICAGO, ILL.

The Worthington pump shown is direct-connected to a Westinghouse motor, and both suction and discharge lines are controlled by Kennedy valves. The connections between the Armco steel pipe in the foreground and the valves above and below are 16-inch Victaulic joints, and the connection at the left is a 16-inch Dresser coupling

Manufacture and Sale of Meters in Canada

The Pittsburgh Equitable Meter Co., Pittsburgh, Pa., has announced that Peacock Bros., Ltd., Montreal, Quebec, Canada, will manufacture and sell the products of the Pittsburgh Company in Canada. Peacock Bros. are well known throughout the Dominion, having been engaged in the manufacturing business for 35 years. For a number of years they have manufactured and sold Nordstrom lubricated plug valves, under license from the Merco Nordstrom Valve Co., a subsidiary of the Pittsburgh Equitable Meter Co. This new agreement enables the Canadian firm to increase its manufacturing operations and extend its selling efforts to other fields, through the production of the well-known Emco line of gas meters, regulators, accessories and Pittsburgh water meters and allied appliances.

Hydrant Attachment Makes Street Shower for Hot Days

A street shower device which throws a soft, gentle spray of water in a radius of 20 feet, and which can be attached to a hydrant or detached in 20 seconds, has been developed by the Bradley Washfountain Co., Milwaukee, Wis. This Bradley street shower furnishes recreation for the children at the nearest hydrant and is economical in the use of water. The volume of the spray can be regulated, and it can be easily adapted also to use in playgrounds and parks. The attachment weighs only nine pounds and is easily screwed into the hydrant nipple which faces the street.

THE BRADLEY WASHFOUNTAIN IN DETAIL AND IN SERVICE

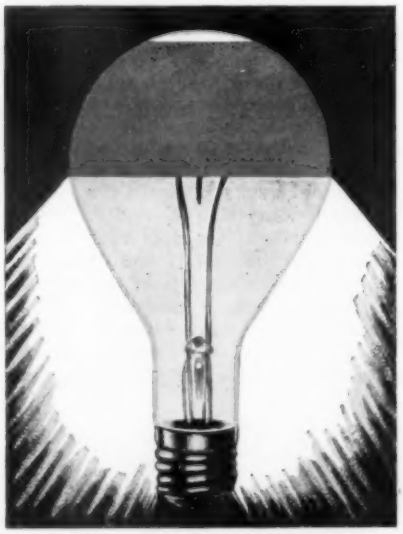
CITY EXECUTIVES

Solve the conflict between loss of income and safe street lighting.

It is not necessary to darken your city. Protect your homes and streets from crime and accident by using

The revolutionary new
Welsbach Silvray Processed Street Lamps

More light at the same cost.



WELSBACH SILVRAY PROCESSED LAMP
Light rays toward the street
Protected by U. S. Letters Patent

WELSBACH STREET LIGHTING COMPANY *of* AMERICA
261 NORTH BROAD STREET · PHILADELPHIA, PA.

Outdoor Lighting

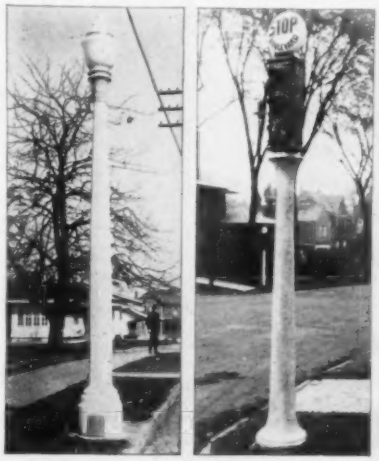
A Section of *The American City*
Devoted to the Lighting of Streets, Highways, Bridges, Airports, Athletic Fields and Parks, and the Floodlighting of Public Buildings

Beauty and Economy with Concrete Lighting Standards

SAFETY against accidents and hold-ups, and relief from the fatigue of night driving, are needs that are demanding better lighting of city streets and of highways.

There has been considerable improvement in the manufacture of concrete lighting standards during the last few years, with the result that this type is now widely used and giving economical service. The designs have been improved, as well as the methods of manufacture, and the concrete post is now particularly desirable because of its attractive appearance. The standards as now made have a clear, sparkling granite or marble finish which requires no painting, thus saving approximately 70 cents a post per year. They withstand severe handling, and only a head-on collision will demolish a post.

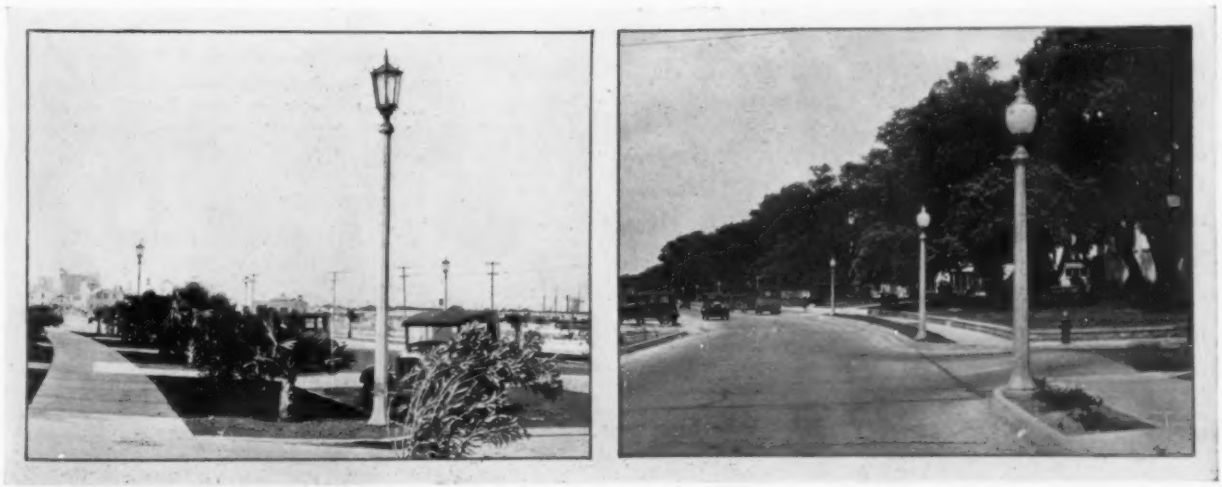
The development of concrete lighting standards has advanced from the open mold type to the vibrated and centrifugal-spun types using machined-metal molds. Reinforcing is welded into a complete cage securely held in the mold at a minimum distance of $\frac{3}{4}$-inch from the surface. Crushed granite or marble chips are used throughout the posts, with a low water-cement ratio to produce a dense concrete.



The top film of cement is removed either by acid-etching or by polishing with a carborundum wheel to give a terrazzo finish to the surface of the post. The tops of the posts are arranged to take any of the standard glassware or lanterns furnished by the leading electrical companies.

The following are a few of the cities and public utility companies that have concrete pole installations:

Cities	*Approximate No. of Standards*
Chicago	20,000
South Park Comsn., Chicago	6,000
Lincoln Park, Chicago	4,500
Milwaukee	20,000
St. Louis	20,000
Oak Park, Ill.	5,000
Berwyn, Ill.	2,000



TYPES OF CONCRETE STANDARDS FOR STREET, BOULEVARD AND TRAFFIC LIGHTING

DO YOU RECOGNIZE THE IMPORTANCE OF GOOD STREET LIGHTING GLASSWARE?

DAY and night, the glassware is one of the most important parts of your street lighting equipment. During the day it catches the eye; after dark it transmits the light.

Assure yourself of the most satisfactory results by installing Gleason-Tiebout glassware. Among its advantages are beauty of form, rippled surface texture, diffusion of light, and low maintenance. Modern manufacturing methods are an important factor in obtaining these advantages.

Scientifically designed glassware is essential for correct illumination. Gleason-Tiebout can help your city to obtain maximum protection, and consequently the greatest possible return in decreasing accidents and crime.

Gleason-Tiebout makes glassware to meet specifications of General Electric engineers. These engineers will be glad to assist you in planning installations that will meet every requirement.

General Electric Form 12 Novalux street lighting unit with Gleason-Tiebout No. 169 globe and No. 1169 canopy

•

(In circle) Glassblower removing a globule of glass from a Gleason-Tiebout furnace—the first step in the manufacture of scientifically designed glassware

•

PROPER STREET LIGHTING PROMOTES SAFETY, DISCOURAGES CRIME, AND BOOSTS BUSINESS

•

GT-23

GLEASON-TIEBOUT GLASS COMPANY

99 COMMERCIAL STREET, BROOKLYN, N. Y.

Elmhurst, Ill.	2,000
Boston	1,500
Forest Park, Ill.	1,200
Marquette, Mich.	1,000
River Forest, Ill.	1,000
Cicero, Ill.	600
Bellwood, Ill.	300
Kenilworth, Ill.	300
Lake Forest, Ill.	300
New Orleans	300
Los Angeles	——
Memphis	——
Seattle	——

Utility Companies

Alabama Power and Light Co.
Central Illinois Public Service Co.
Edison Electric Illuminating Co., Boston
Milwaukee Electric Railway and Light Co.
New Orleans Public Service Co.
Public Service Co. of Northern Illinois

The village of Oak Park, Ill., with 5,000 concrete standards, has replaced only sixteen in five years. It has been estimated that the saving in replacement and maintenance costs alone will carry the interest charges on the investment, with sufficient surplus to retire the entire amount within a reasonable period.

TWO-LIGHT POST, MONROVIA, CALIF.

The Lighting of the High-Level Bridge at Hamilton, Ontario

A BRIDGE has always presented an interesting lighting problem. It has something in common with a street-lighting problem, since it consists of a roadway and pedestrian sidewalks. It differs, however, in that there are no adjacent buildings on either side whose windows and architectural details should be illuminated to present an attractive composite appearance.

Strictly speaking, the light should be confined to the horizontal surfaces, and not only is spilled light wasted but it is a menace to navigation if there is boat traffic on the stream spanned by the bridge. In some respects the problem is like that of highway lighting in the necessity for rigid control of the light, except that modern bridges are structures of architectural character and the lighting fixtures and supports must be harmonious in appearance.

A recent and notable recognition of these principles is illustrated in the solution of W. L. McFaul, City Engineer of Hamilton, Ontario, in the lighting of the new Hamilton high-level bridge. With a roadway width of 32 feet, he selected Westinghouse Paragon Senior units, spaced 55 feet and opposite with 300-watt lamps. The direction of the light is confined to the usable zones in Holophane-Westinghouse Bi-lux refractors.

The roadway approaches to the bridge preserve the same intensity and distribution of illumination by a staggered arrangement on 100-foot centers with 500-watt lamps. The non-symmetrical distribution of light from the Holophane refractor equalizes the wider spacing and the higher wattage lamps.

The result is a lighting system which blends with the architecture of the structure, which protects and facilitates pedestrian and vehicular traffic, and reflects the high engineering skill of Mr. McFaul.

HARMONIOUS AND EFFICIENT BRIDGE LIGHTING, HAMILTON, ONT.

Gaseous Discharge Lamps for Highway Lighting

MANY experiments, and several actual installations on highways abroad, have been made with lamps operating by means of an electric discharge within a gas-filled glass tube. Glass tubing in more elongated form, containing neon or some other gas, is familiar in sign lighting, where the usual monochromatic or single-color feature of such lamps is an advantage, although somewhat of a drawback in general lighting.

Two installations abroad, one in Holland and the other in England, utilize the Philips sodium lamp, in which sodium vapor produces a strong yellow light which, although not desirable for ordinary interior lighting purposes, is not unsuited for highway lighting, where illumination for motor-vehicle traffic is the main objective. In fact, it is claimed to have the advantage of producing sharper contrasts and less glare than white light.

The installation in Holland is on a mile of main highway between Maastricht and Nijmegen. The glass tube is about 2.36 inches in diameter and 4.72 inches long, and is enclosed in a second glass tube with a vacuum between. Each lamp uses about 100 watts and is said to produce from 50 to 60 lumens per watt, or about three times the efficiency of the incandescent filament lamp.

The units are placed in staggered arrangement, and are alternately 60 and 115 feet apart along the roadway. The beam of a lamp on the right-hand side is directed obliquely ahead toward the next unit to the left; those on the left are directed ahead and to the right.

Toward the end of 1932 a somewhat similar installation was made on a mile the famous airport located at Croyden, England.

During the convention of the Illuminating Engineering Society at Swampscott, Mass., in September, 1932, the General Electric Co. displayed three sodium vapor lamps in outdoor experimental use at the West Lynn plant.

In March, 1933, a somewhat different lamp, developed by the British General Electric Co., was placed in use on Watford Road, Wembley, England, for a distance of a little over a mile. The lighting is by what is known as the Osira electric discharge lamp, and utilizes a mixture of gases. It consumes 420 watts and is said to be about 2½ times as efficient as a tungsten filament lamp. In the two English installations, as well as that in Holland, more light intensity is directed away from the driver than toward him.

GENERAL ILLUMINATION ENGINEERING CO.

Cincinnati, Ohio . . . . . Carew Tower

WHY WASTE LIGHT?

Economy today demands the most in value for each appropriation made to public works. Everywhere cities are requiring street lighting to fall in line. Energy and equipment must be used to best advantage; but what about the resulting light! Is more of it to be wasted as glare and sky illumination than is used to provide *Seeing Ability*? For economy, let General Illumination engineers show you how to use wasted light to improve *Seeing Ability*.

STREET LIGHTING
- ZONING SURVEYS
- ILLUMINATION ANALYSIS
- ELEC. RECOMMENDATIONS
- VALUATION APPRAISALS
- RATE ADMINISTRATION
- CONTRACT SUPERVISION

FLOODLIGHTING
- AIRPORT
- ARCHITECTURAL
- DISPLAY
- INDUSTRIAL
- RECREATIONAL

LIGHTING EXPERTS SELLING NOTHING BUT SERVICE

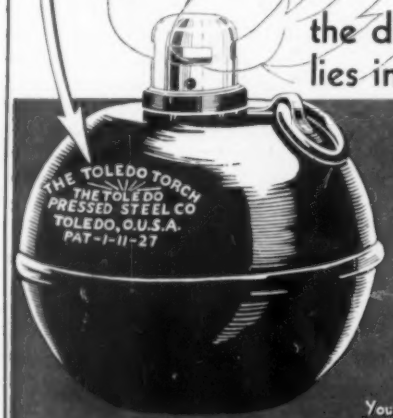
"Ruggedness of design is the basic reason for the reliability of Buffalo-Springfield rollers."

The Buffalo-Springfield Roller Co.
Springfield, Ohio

BUFFALO-SPRINGFIELD

this name on your torches means you have THE BEST

the difference lies in the burner



No other safety light can give you so dependable and economical protection . . . yet real TOLEDO TORCHES cost no more than the rest.

• • •

Your dealer can supply you.

USE THE TOLEDO TORCH AND OTHER SIGNAL MEANS SAFETY

The Toledo Pressed Steel Co.
TOLEDO OHIO

Save with Steel

Install Stewart Fence

Stewart has manufactured Iron and Chain Link Wire Fences for all purposes for 47 years. Such continued success is only possible through absolute satisfaction. When Fencing problems arise it is only natural that Stewart Fences receive first consideration.

Literature upon request.

The Stewart Iron Works Co., Inc.
915 Stewart Block, Cincinnati, O.

Stewart IRON AND WIRE FENCES

LYLE SIGNS

will help you to

—Reduce Accidents
—Beautify Your City
—Make Permanent Improvements
—Control Traffic

Write for 1933 Catalog

LYLE SIGNS, INC.
MINNEAPOLIS

Portable Asphalt Maintenance Plants

A PORTABLE UNIT WITH A CAPACITY OF 400 YARDS PER DAY

ACCURATE CONTROL OF MATERIALS ASSURING ACCURATE MIXTURE TO COMPLY WITH ANY STANDARD SPECIFICATIONS

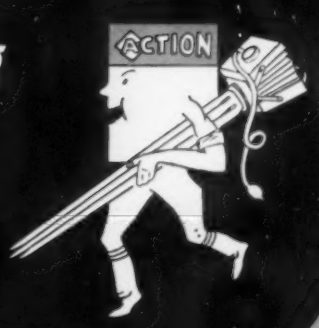
Send for Bulletin R-400

HETHERINGTON & BERNER INC.
INDIANAPOLIS, IND.

Stationary — Railway — Portable and Semi-Portable Plants

ACTION

THE NEW DEAL has changed the picture . . so have Allis-Chalmers Tractors and Road Building Machinery in the Construction Field!

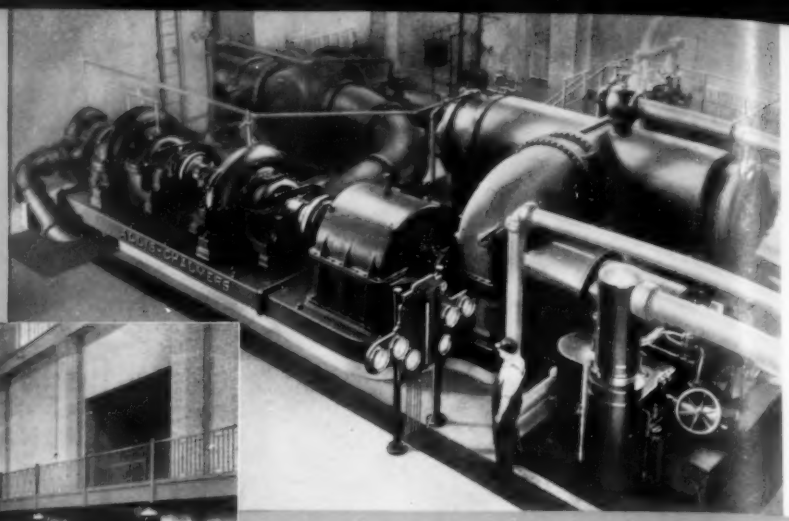


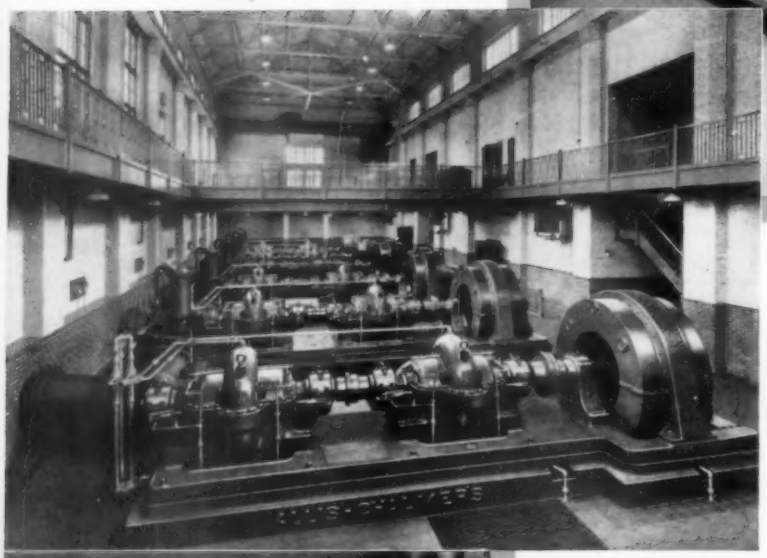
● *WRITE FOR THE ACTION MAGAZINE*

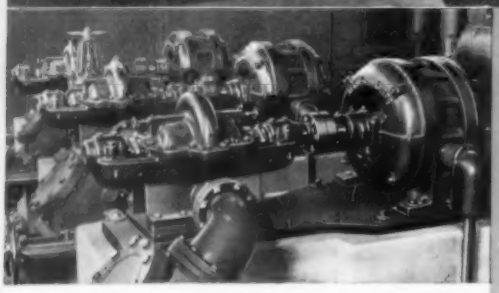
ALLIS-CHALMERS

TRACTOR DIVISION—MILWAUKEE, U. S. A.

TRACK TYPE TRACTORS • ELEVATING GRADERS • TRACK TYPE WAGONS
POWER CONTROLLED GRADERS • SPEED PATROL GRADERS • POWER UNITS
WAGON TRACKS • HAND CONTROLLED GRADERS • WHEEL TYPE TRACTORS







UPPER—60 MGD steam turbine driven pumping unit. Addition to pumping station at Milwaukee, Wisconsin.

MIDDLE—Four 28 MGD and two 24 MGD synchronous motor driven pumping units in new pumping station at Pittsburgh, Pa.

LOWER—Three 2 MGD motor driven pumping units replacing obsolete equipment in pumping station at Waycross, Ga.

• • •

OTHER ALLIS-CHALMERS PRODUCTS

- Crushing Machinery Crushers, Gyratory, Jaw Screens, Rotary, Vibrating Scrubbers, Washers Complete Crushing and Sand and Gravel Plants
- Cement Making Machinery
- Centrifugal Pumps
- Compressors and Blowers (Rotary and Centrifugal)
- Motors, Texrope Drives
- Transformers (Power and Distribution)
- Power Equipment Steam Turbines Hydraulic Turbines Generators, Transformers Switchgear
- Plate Work
- Saw Mill Machinery
- Timber Preserving Machinery
- Tunnel Shovels

• • •

Centrifugal Pumps

for Public Works Programs

In any Public Works Program, pumps are an important though sometimes obscure adjunct, a pure and adequate water supply being an essential.

City water supply, whether increasing the supply by adding to present facilities, building new stations, or replacing obsolete equipment are fundamentally public works and of a self-liquidating nature. Sewage disposal, filtration and increased fire protection come under the same head. In connection with land projects, irrigation, drainage, and sanitation, pumps are often necessary. In public buildings, numerous pumps are used for different kinds of service. The diversified line of Centrifugal Pumps built by Allis-Chalmers together with their high efficiency makes these pumps particularly adaptable in public works programs and as Allis-Chalmers also builds motors and turbines for the drives, their combined units afford undivided responsibility.

ALLIS-CHALMERS
MILWAUKEE, WIS. U.S.A.

NO NEED

FOR THIS RED MARK ON THE BOOKS!

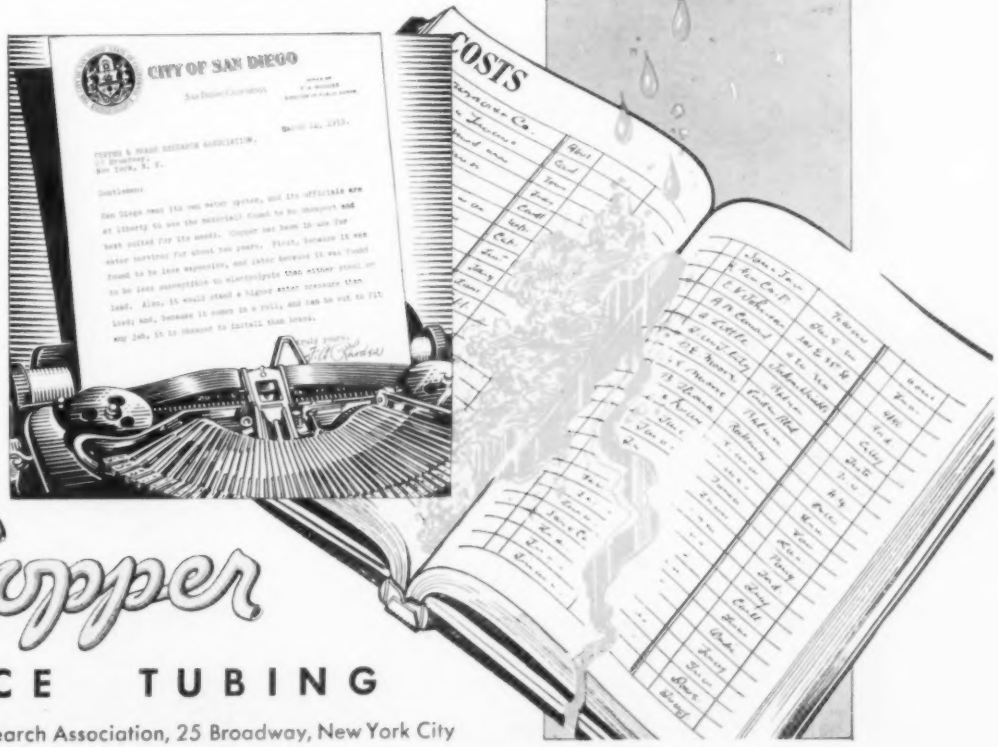
THAT'S the sad part of it—there's no need for "going into the red" to replace rusted service pipe. If the pipe is made of copper in the first place it will never clog up with rust. Copper can't rust. And it resists soil corrosion. Hence, it stops the tearing up of pavements and walks for replacement.

And the initial installation is easy. Because it's flexible, copper tubing can be bent without making extra joints. Because it comes in long lengths or coils, it's easier and more economical to install.

Copper water tubing is efficient—economical—lasting.

Many modern codes and regulations are recognizing copper's qualities by specifying it.

Write for information. The wide experience of this research association is freely available upon request.



From San Diego, Cal. Mr. F. A. Rhodes, Director of Public Works, sums up the case for copper service tubing in San Diego. Here is the story of several hundred cities.

Copper

SERVICE TUBING

Copper & Brass Research Association, 25 Broadway, New York City

MORE HYDRANTS = LESS FIRE LOSS!

"Close spacing of hydrants is an economical practice", observes Water Works Engineering .

More important than this, however, is to install hydrants that are freeze-proof, fool-proof and that will deliver large volumes of water without frictional loss.

Columbian hydrants in *simplicity* of design, *unimpeded flow* of water and *ample proportions* meet these requirements fully. Columbian valves measure up to the high standards of Columbian hydrants in all respects.

The test of twenty-five years service with over three thousand Water Works Systems amply proves the superior design and quality of the "Columbian" line.

The ACE of Fire Hydrants
COLUMBIAN
Columbian Iron Works...Chattanooga, Tenn.

All men ask:

"WHAT WILL YOU DO WITH OUR BILLIONS?"

"PERMANENCE" rather than "price" or "politics" is the all-important word in the nation's increased public works program.

Permanent dams, permanent roads, water works built for the future—these will form the foundation for tomorrow's prosperity.

But of what will they be built? Can "permanence" be built by compromise?

Today's leaders must make the old, old choice between quality and price in the selection of materials and equipment. Their responsibility is great.

All men will ask:

"Will our billions help to build a new and permanent prosperity or will they be wasted because quality was sacrificed for price?"

The Hersey Disc Meter

The result of 50 years of continuous and successful effort to produce a quality product.

HERSEY
WATER METERS

HERSEY MANUFACTURING COMPANY Main Office and Works: Corner E and Second Streets, South Boston, Mass.

Branch Offices: NEW YORK CITY, 290 Broadway; PORTLAND, ORE., 475 Hoyt Street; PHILADELPHIA, PA., 314 Commercial Trust Bldg.; ATLANTA, GA., 510 Haas-Howell Building; DALLAS, TEX., 402 Praetorian Building; CHICAGO, ILL., 844 Rush Street; SAN FRANCISCO, CAL., 553 Howard Street; LOS ANGELES, CAL., 450 East Third Street

STANDARD

SOCONY BRAND

ASPHALT PRODUCTS

Socony Asphalt Binder "B" penetration method on Middle Road, Tuckahoe, New York

Standard Cut-Back Asphalt for surface treatment and mixed-in-place or road mix construction.

Standard Asphalt Binder A for surface treatment.

Standard Asphalt Binders B & C for penetration work (Asphalt Macadam).

Standard Paving Asphalt 51-60 and 61-70 Penetration for the mixing method (Asphaltic Concrete).

Standard Cold Patch Asphalt for all types of patching.

Standard Paving Asphalt for sheet asphalt paving.

Standard Asphalt Paving Fillers.

Standard Waterproofing Asphalt.

Specifications and all other particulars furnished on request.

STANDARD OIL COMPANY OF NEW YORK, INC.

A SOCONY-VACUUM COMPANY

26 BROADWAY, NEW YORK CITY.

SOCONY ASPHALTS AND ROAD OILS

In 1953 . . . Will the drainage structure still testify to your good judgment?

A pair of 60", GOHI Corrugated Culverts furnished to Becker County, Minn., for Highway No. 14 near Two Inlets, Minn.

GENUINE OPEN HEARTH IRON GOHI PURE IRON - COPPER ALLOY

(Meet copper-bearing pure iron requirements in all accepted specifications for corrugated metal culverts.)

It must not fail . . . so they made it of metal

In the diving bell men work safely on the ocean floor, protected by metal from the crushing weight of thousands of tons of water. Human life depends upon the ability of metal to stand the strain. It is the culvert of metal that can also withstand the strain of shifting, settling earth fills without cracking, crumbling, or disintegration.

THERE are thousands of culverts made from GOHI Corrugated Pipe which have been doing a job . . . in the ground . . . for twenty years and more. The roads under which many of them were laid have long since been abandoned or relocated, and the GOHI Pipe reinstalled in another location.

GOHI Corrugated Pipe gives such lasting service because it is made from 99.90 per cent Pure Iron-Copper Alloy. It has the strength to resist the pressure of settling or shifting earth; the flexibility to combat freezing water and the vibration of heavy traffic; the rust resistance that smiles at time, wear, weather, and corrosion, resulting in fewer drainage problems and lower taxes.

Get all the facts about GOHI, whatever your drainage needs. Write the GOHI fabricator nearest you.

GOHI CORRUGATED PIPE

FOR ALL DRAINAGE PURPOSES

GOHI CULVERT MANUFACTURERS, Inc., Newport, Kentucky

BANCROFT & MARTIN ROLLING MILLS CO., S. Portland, Me.
NEW ENGLAND BOLT CO., Everett, Mass.
DENVER STEEL & IRON WORKS CO., Denver, Colo.
A. N. EATON METAL PRODUCTS, Omaha, Nebr.
FEENAUGHTY MACHINERY CO., Portland, Oregon
TENNISON BROTHERS, Texarkana, Ark.
CENTRAL CULVERT CO., Ottumwa, Iowa
ST. PAUL CORRUGATING CO., St. Paul, Minn.
CAPITAL CITY CULVERT CO., Madison, Wis.
A. N. EATON METAL PRODUCTS CO., Billings, Mont.
THE NEWPORT CULVERT CO., Newport, Ky.

When you write for that catalog, kindly mention THE AMERICAN CITY

CITY EQUIPMENT and MATERIALS CATALOG DATA

THE AMERICAN CITY should always be mentioned when writing for this material which is furnished free.

Keep your files up to date by checking over these items each month and writing for those you need.

TILTING DISC CHECK VALVES

423. The Chapman Valve Mfg. Co., Indian Orchard, Mass., will be pleased to send its illustrated literature on Chapman tilting disc check valves, which have a special anti-slam feature, and eliminate large losses of head and severe wear of the moving parts.

PIPE TOOLS AND MACHINES

424. Oster "Bull Dog" die-stocks, chip chasers, receding die-stocks, pipe vises and pipe cutters, both power and hand, are described in List No. 78-C of the Oster Mfg. Co., Cleveland, Ohio.

A SEWAGE SCREENINGS DIGESTER

425. Bulletin No. 111 issued by Pacific Flush Tank Co., 4241 Ravenswood Ave., Chicago, Ill., describes the PFT sewage screenings digester in detail, has tables of the quantity of screenings recovered from sewage in a number of cities, and technical data on the work of the digester, as well as a bibliography on sewage screenings.

SLUDGE COLLECTORS OF LARGE CAPACITY

426. Bulletin No. 545-C issued by the Jeffrey Mfg. Co., 970-99 N. Fourth St., Columbus, Ohio, gives complete data on Jeffrey sludge collectors, which have large carrying capacity, permitting intermittent operation. This not only means a considerable power saving but relieves the tanks of all mechanical agitation between operating periods, resulting in a thicker sludge and a clearer effluent.

ECONOMY IN WASTE DISPOSAL

427. Pittsburgh-Des Moines incinerators, which combine pleasing design with low-cost operation and reliable performance in disposing of garbage and rubbish in a clean, odorless, sanitary manner, are described in literature which may be secured from the Pittsburgh-Des Moines Steel Co., 3452 Neville Island, Pittsburgh, Pa.

A VACUUM FILTER FOR SEWAGE FILTRATION

428. Mechanical sewage filtration which produces a high degree of clarification at low cost is described in an illustrated folder, Form 5-A, which may be secured from the Municipal Sanitary Service Corp., 155 E. 44th St., New York.

AN AUTOMATIC TRAFFIC WHISTLE

429. The Duers automatic traffic whistle is a device complete within itself, developed primarily for use in connection with red, amber and green stop-and-go lights or traffic signals of any make, to automatically blow a regulation police whistle as an additional warning of the light changes to motor and pedestrian traffic. A complete description of this whistle may be secured from the Duers Signal Co., Inc., Glens Falls, N. Y.

MEASURING AND CONTROLLING EQUIPMENT

430. for water and sewage plants is illustrated and described in the catalog material of Simplex Valve and Meter Co., 6743 Upland St., Philadelphia, Pa. Interesting bulletins are available for you on the Simplex venturi type meter and the Simplex rate of flow controller.

DARK STREETS ARE FALSE ECONOMY

431. Booklet A-1206, "Bringing Cities Out of the Twilight Zone," answers logically and truthfully the question asked in so many cities, "Can't we save money by cutting street lighting costs?" The booklet can be secured from Westinghouse Electric & Mfg. Co., Room 2-N, East Pittsburgh, Pa.

A SINGLE-SUCTION SELF-PRIMING PUMP

432. Complete information regarding the new Buffalo self-priming single-suction pumps for sewerage or general service may be secured from Buffalo Pumps, Inc., Buffalo, N. Y.

A NEW LINE OF DIESEL ENGINES

433. A new line of stationary 4-cycle diesel engines with mechanical injection, complete pressure lubrication, totally enclosed, all parts accessible, of rigid construction and completely equipped, has been announced by Nordberg Mfg. Co., Milwaukee, Wis. These engines are described in Bulletin 51, which will be sent free on request.

KEEPING THE POOL SAFE AND SANITARY

434. A new booklet bearing this title has been issued by The Matthieson Alkali Works (Inc.), 250 Park Ave., New York, telling of the effective protection of swimming pool users by the use of HTH as a disinfectant.

FIRST AID EQUIPMENT FOR CITIES

435. Catalog 4-A issued by Mine Safety Appliance Co., Braddock, Thomas and Meade Sts., Pittsburgh, Pa., gives complete information regarding M.S.A. first aid equipment, including oxygen breathing apparatus, gas masks of all types, gas indicators, gas detectors, and inhalators for respiratory and resuscitative uses.

A GUARANTEED WATER SUPPLY

436. Layne & Bowler, Inc., Dept. B, Memphis, Tenn., which has been known for fifty years by municipalities, industries and railroads for the integrity of guarantee of "Water or No Pay," will be pleased to send you free bulletins on Layne pumps, wells and well-water systems, which are of special value to municipal officials.

3,200,000 METERS

437. More than 3,200,000 Worthington and Gamon water meters are used by municipalities and water companies. They are backed by the Worthington-Gamon Meter Co., Harrison, N. J., which will be pleased to send to those interested its literature on water-waste prevention through the use of these meters.

CONSTRUCTION WITH CRAWLER TRACTORS

438. The construction of low-cost roads, canals and embankments with Caterpillar tractors and road machinery is clearly depicted and described in simple language in a particularly well prepared 48-page booklet, Form 1655, which the Caterpillar Tractor Co., Peoria, Ill., prepared primarily for its export trade. Contractors and engineers in the United States may secure copies for their information gratis on request.

WATER REVENUE INCREASED AND COSTS LOWERED

439. This is the record of many water works which have installed water meters. The Badger Meter Mfg. Co., Milwaukee, Wis., will be pleased to furnish detailed information concerning Badger water meters, which will make any conservation program of a water department give maximum returns.

HIGH EFFICIENCY AND LOW MAINTENANCE FOR STREET LIGHTING

440. Information regarding any type of luminaries for highway and main artery illumination, and plans for efficient and economical lighting on streets, and main arteries, may be secured from General Electric Co., Dept. 6-201, Schenectady, N. Y.

WATER SPORTS EQUIPMENT

441. "Laughing Loon" water sports equipment, including international regulation diving boards, four-level diving stands, diving chutes, landing floats, float ladders, etc., are illustrated and described in a new illustrated folder issued by the Hussey Mfg. Co., 330 Railroad Ave., North Berwick, Maine.

A NEW HIGHLY VISIBLE HIGHWAY GUARD

442. Circular No. 110 issued by Pittsburgh Steel Co., Pittsburgh, Pa., describes the Pittsburgh safety highway guard, which prevents accidents and minimizes damage to the vehicle and to the guard itself because of its construction. The guard is a 14-inch woven band with a high breaking strength and high visibility, easily erected and readily handled by a regular highway maintenance crew.

A VALUABLE TRAFFIC EQUIPMENT CATALOG

443. The new TEC traffic equipment catalog, which is just off the press, is fully illustrated and contains many valuable computing charts for highway traffic officials. A free copy may be secured by writing to the Traffic Equipment Corp., 439 W. 42nd St., New York.

SOIL STABILIZATION WITH CALCIUM CHLORIDE

444. Full particulars regarding the use of calcium chloride for compacting road surfaces and stabilizing the soil, thus offering new type low-cost roads, may be secured from the members of the Calcium Chloride Association; Solvay Sales Corp., 61 Broadway, New York; The Columbia Alkali Corp., Barberton, Ohio; Michigan Alkali Co., 10 E. 40th St., New York, and The Dow Chemical Co., Midland, Mich.

A POWER PUMP FOR ASPHALT EMULSION

445. The Kinney Mfg. Co., 3529-3541 Washington St., Boston, Mass., will be pleased to furnish information regarding its new small pumping unit for applying cold patch and asphalt emulsion under pressure, directly from the drums to the road.

The MATHEWS HYDRANT Has a Trouble-Proof STEM

Note three important things about the stem pictured here:

1. *It can't buckle.* The nut you see is a stop nut, put there to keep the most powerful fireman from jamming, twisting, or buckling the hydrant stem.

2. *It doesn't revolve.* It moves straight up and down to close and open the main valve. That saves wear on the valve seat and leather, on the packing, and on the stem itself.

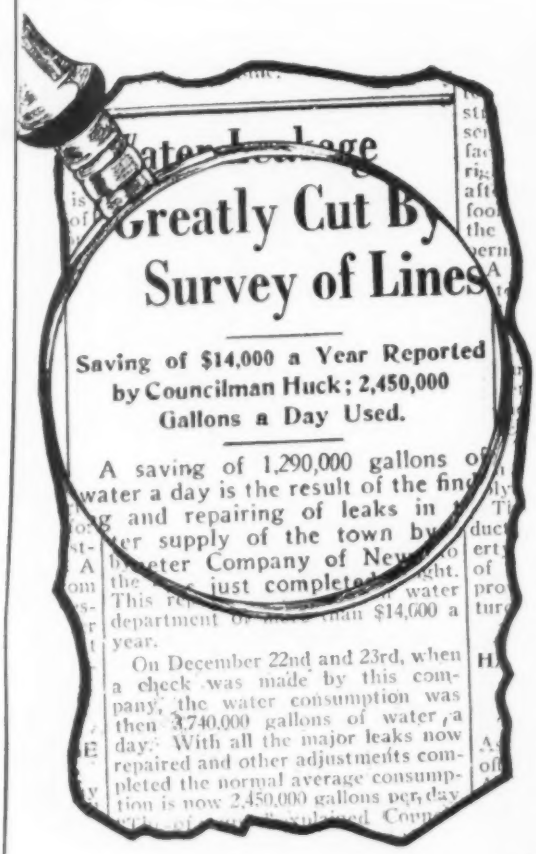
3. *It can't rust tight.* Where this one-piece stem passes through the stuffing box, it is bronze-bushed. It stays clean, smooth and free-acting, and prevents wear on the packing. Water never reaches the operating thread.

This stem safely, surely, and directly connects 200-pound firemen with your protecting water. It is part of the thoughtful construction of every Mathews Modernized Hydrant. Your town needs them. Did you know that when broken they can be replaced without digging? Write for catalogue.

"SAND-SPUN" PIPE

NO BETTER PIPE THAN "SAND-SPUN" IS MADE. A PRODUCT FUNDAMENTALLY DIFFERENT FROM PIT-CAST PIPE. NO ANNEALING IS NECESSARY . . . 16 ft. lengths furnished in all sizes 4 inches to 36 inches inclusive. 20 ft. lengths also furnished in sizes 12 inches to 30 inches inclusive . . . We are prepared to ship by water, rail or truck.

R·D·WOOD & CO. 400 CHESTNUT STREET PHILADELPHIA
ESTABLISHED IN 1803



Water Leakage
Greatly Cut By
Survey of Lines

Saving of $14,000 a Year Reported by Councilman Huck; 2,450,000 Gallons a Day Used.

A saving of 1,290,000 gallons of water a day is the result of the finding and repairing of leaks in the water supply of the town by the Pitometer Company of New York, the survey just completed. This report of the water department of more than $14,000 a year.

On December 22nd and 23rd, when a check was made by this company, the water consumption was then 3,740,000 gallons of water a day. With all the major leaks now repaired and other adjustments completed the normal average consumption is now 2,450,000 gallons per day.

from
"The Independent Press"
Bloomfield, N. J., May 5, 1933

A Saving of $14,000 a Year Looks Big to *Any* City!

Accustomed as we are nowadays to think of money in terms of billions (through daily reading of such newspaper items as "Three Billion Dollars for Public Works!")—we still believe there's many a city the size of Bloomfield, N. J., that would be mighty well pleased to report a saving of $14,000 a year in a single department!

Bloomfield did it by calling in the Pitometer engineers for a WATER WASTE SURVEY.

In times like these, ECONOMY is the watchword everywhere. In cities, towns and villages all over the land the cry is: "STOP waste and extravagance!"

Bloomfield reduced its daily water consumption from 3,740,000 to 2,450,000 gallons per day.

Your city might well follow Bloomfield's example, with the price for the survey contingent on the amount of waste detected, and money saved.

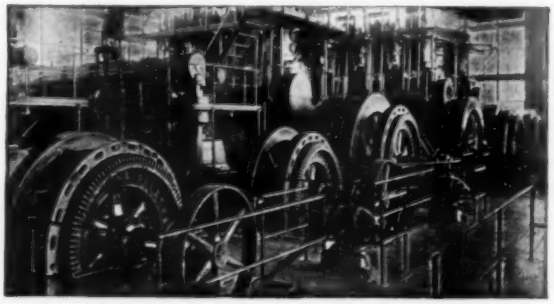
Let us send you further interesting particulars.

THE PITOMETER COMPANY
Water Distribution Engineers
52 Church Street **New York City**

LUBRICATION COSTS ARE LOW FOR DIESEL ENGINES

Modern Diesel Engines with semi- or totally enclosed construction are remarkably economical in lubricating oil consumption. McIntosh & Seymour Diesel Engines are provided with a lubricating oil system which makes the best use of lubricating oil.

This system provides for the use of the oil over and over again. During each circuit the oil is allowed to come to rest and deposit any entrained dirt in the rest tank.



Five McIntosh & Seymour Diesel Engines operating in St. Petersburg, Florida

Many installations of McIntosh & Seymour Diesel engines are outstanding in the small amount paid for lubricating oil. In many of these installations the cost is less than one-half a mill per horsepower hour. This may be contrary to your general belief, but actual records prove it.

The cost of producing power with Diesel engines can be estimated to a remarkable degree of accuracy. Our engineers will help you figure your power problem if you will but ask us.

McINTOSH & SEYMOUR CORP.
Division of American Locomotive Co.
Main Office and Works: AUBURN, N. Y.
District Offices
New York Washington, D. C. Chicago Tulsa, Okla.
Omaha, Nebr. Houston, Tex. San Francisco

H·H INHALATORS

Indispensable resuscitating equipment for the municipal beach or swimming pool!

On the beaches at Atlantic City, Coney Island, Long Beach; at the municipal swimming pools in Detroit, Los Angeles, Pittsburgh and thousands of other public pools and beach resorts, H-H INHALATORS are constantly proving invaluable in administering oxygen and carbon dioxide to victims of suspended respiration and drowning.

This device has been officially accepted by the Council on Physical Therapy of the American Medical Association and approved by the American Gas Association and the Association of Police and Fire Surgeons.

Your swimming pool or bathing beach will be safer if H-H INHALATORS are readily available this season. They are time-tried devices of proven merit and should be a vital part of the life saving equipment of every municipality. Write for our bulletin 107 describing H-H INHALATORS in detail,—or better yet let us arrange for a demonstration.

MINE SAFETY APPLIANCES COMPANY

Braddock, Thomas and Meade Streets, Pittsburgh, Pa.

District Representatives in Principal Cities

M. S. A. EQUIPMENT includes Breathing Apparatus . . . Inhalators . . . Masks of All Types . . . Gas Indicators . . . Eye and Head Protectors . . . Edison Electric Cap Lamps . . . Safety Clothing . . . First Aid Equipment . . . Descriptive Bulletins will be sent on request.

Half a CENTURY *of* PERFORMANCE

The performance of Ludlow products over the past 50 years is an excellent reason we know for their specification today. Here is what some old-established Ludlow customers say about that performance:

★ **1881 52 YEARS** — " . . . 8 in. Valve set in 1881, and in continuous service till November, 1930, when replaced with larger pipe . . . as good as ever . . . in stock for future use."

★ **1886 47 YEARS** — " . . . Our Ludlow Hydrants are in as good condition as they were at the time of the construction of our works (1886)."

★ **1895 38 YEARS** — " . . . 22 Ludlow Hydrants since 1895 . . . perfect service with practically no maintenance . . . we want more such Hydrants."

★ **1906 27 YEARS** — "All Hydrants and Valves formerly used at this plant have been replaced with Ludlow."

★ **1932** — " . . . We checked our 600 Ludlow Hydrants 1 to 43 years old. Less than 5 per cent needed any repair and these only gate rubbers."

These are quotations from actual letters. The originals may be seen on request.

Specify "Ludlow" Gate Valves and Hydrants, and assure for your city similar performance—similar freedom from repairs—similar protection. Ludlow performance is time-tested.

The LUDLOW VALVE MFG. COMPANY

TROY · · · · NEW YORK

FARNAN BRASS

the standard for

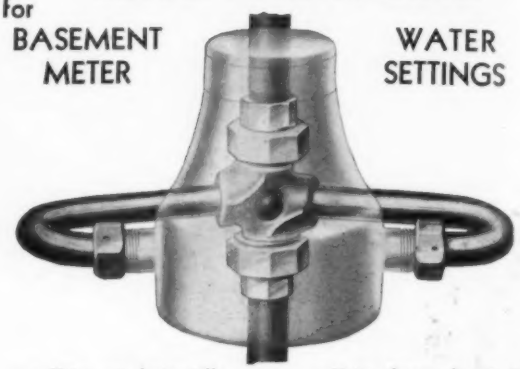
Stops, Couplings and Fittings

for lead, iron or copper service pipe—
all sizes and types to meet your requirements—
tested with 200 pounds hydraulic pressure—
unconditionally guaranteed—
samples and quotations on request—
just drop a line to—

THE FARNAN BRASS WORKS CO.
CLEVELAND, O.

Manufacturers of
Brass Water Service Stops and Fittings since 1852

The **COPPERHORN**
METER COUPLING
for BASEMENT METER WATER SETTINGS



●1 *Meter set horizontally* at desired height in vertical run of piping without ells, nipples or couplings.

●2 *All copper water way.* Freedom from rusting and corrosion. Freezing will not burst the Copperhorn.

●3 *Smooth oversize tubing* and sweeping bends permit maximum flow.

●4 *Meter changes do not disturb piping,* which is held connected and supported even when the meter is out.

●5 *On new services it serves as a spacer* or permanent template to connect in the piping, assuring proper space.

●6 *Provides a permanent electrical ground connection.* No other loop or ground around meter needed.

May We Give You Further Information About the Copperhorn?
The FORD METER BOX COMPANY, Wabash, Indiana
Water Meter Setting and Testing Equipment

McWANE CAST IRON PIPE CO. BIRMINGHAM ALABAMA

PACIFIC STATES CAST IRON PIPE CO. PROVO, UTAH

Manufacturers of

Bell and Spigot type CAST IRON PIPE with or without Precalked Joints
Long lengths. Sand Cast. 1¼ through 12 inches.

SALES OFFICES

NEW YORK	CHICAGO	DALLAS
40 Exchange Place	333 N. Michigan Ave.	1807 Santa Fe Bldg.
SAN FRANCISCO	KANSAS CITY	DENVER
Rialto Building	1006 Grand Avenue	226 Cont'l Oil Bldg.
LOS ANGELES	PORTLAND, ORE.	SALT LAKE CITY
6800 S. Alameda Street	811 Spalding Building	149 W. 2nd South St.

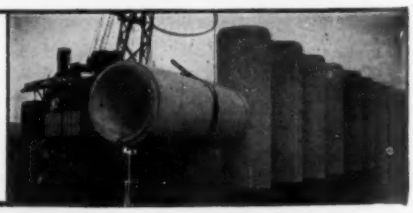
AER·O·MIX
AERATOR — MIXER
Patented

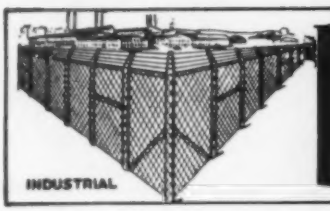
Combined—Low-head Aerator and Thorough Chemical Mixer for your water treatment plant

Write for information

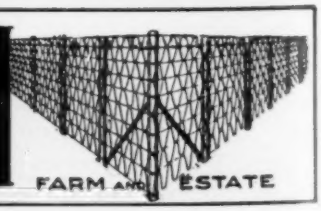
VOGT BROTHERS MFG. CO.
INCORPORATED
LOUISVILLE · · KENTUCKY

LOCK JOINT
Reinforced Concrete Pipe
PRESSURE - SEWER - CULVERT
Lock-Joint Pipe Co., Ampere, N. J.



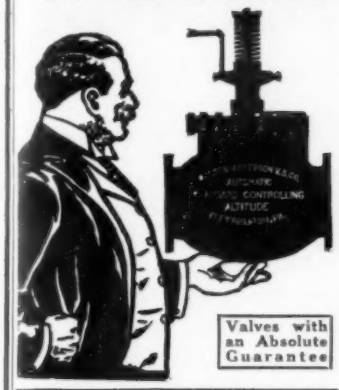


SWEET'S STEEL POSTS
Rolled from the highest grade Carbon steel --- easy to drive --- self contained --- with pleasing appearance and high safety factor.
Write for Descriptive Catalog
SWEETS STEEL COMPANY
WILLIAMSPORT, PA.



WATER CONTROL

without floats or fixtures



Valves with an Absolute Guarantee

A constant water level can be automatically maintained in reservoirs, tanks and standpipes by the use of

GOLDEN-ANDERSON Automatic Cushioned Controlling Altitude Valves

These valves are always cushioned in closing and opening. They are extensively used for automatically maintaining a uniform stage of water in reservoirs, tanks and standpipes. No valves inside. No floats or fixtures, inside or outside of tanks. No freezing troubles. Three ways of operating these valves:
1st—Automatically, by water
2nd—By electricity, if desired
3rd—Automatically work both ways in single line

Detroit, Mich., Water Dept. has in use 5—24" Golden-Anderson Altitude Valves

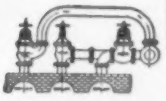
30 of these ALTITUDE VALVES in sizes 6" to 24" serving the City of Los Angeles, Calif., now

NEW HAVEN WATER CO., NEW HAVEN, CONN., HAS 2—24"; 1—16"; 2—12"; 1—10"; 1—8" ALTITUDE VALVES IN SERVICE.

Golden-Anderson Valve Specialty Co.
1329 Fulton Bldg., Pittsburgh, Pa.

"4601" Used by Steel Companies

Pat. Automatic Double Cushioned Triple Acting Non-Return Valves
1. Prevent shut-down due to reversal of steam flow.
2. Instantly close and isolate a boiler when a tube bursts.
3. Cut off steam flow from every boiler instantly when a steam pipe ruptures.
4. Automatically cut a boiler into line.
5. Prevent backflow into cold boiler.
6. The only valve that can be tested in service.



2 Valves In One
Angle, Globe or Elbow

Patent Automatic Cushioned Controlling Float Valves

They carry a constant water level in feed water heaters by perfectly controlling the flow of makeup water.

Operated by protected enclosed copper float.

Cushioned by both air and water.

Operate without hammering, sticking or chattering. No metal-to-metal seats. Made angle or straightway.

Sizes 1 in. to 24 in.

Pat. Cushioned Water Relief Valves
1. Automatically relieve excess pressure.
2. Prevent stress, strain and bursting of mains.
3. Correct mechanical construction.
4. Perfect air and water cushioning.
5. No metal-to-metal seats. No hammering or shocks.
6. Angle and globe pattern. Sizes 2 in. to 24 in.

Pat. Automatic Cushioned Water Float Valves
1. Automatically maintain uniform water levels in tanks, standpipe, etc.
2. Instantly adjusted to operate quickly or slowly.
3. Float swivel to any angle—most satisfactory float valve known.
4. No metal-to-metal seats—no water hammer or shock.
5. Cushioned by air and water.

½" to 24" Angle or Globe

Pat. Automatic Cushioned Water Pressure Regulating Valves
1. Maintain a constant reduced pressure regardless of fluctuations on high pressure side.
2. Perfectly cushioned by water and air. No metal-to-metal seats.
3. The best valve made for maintaining a constant low pressure where consumption is continuous.
4. Operates quickly or slowly as required—No attention necessary.
5. Positively no hammering or sticking. Sizes ½ in. to 24 inches.

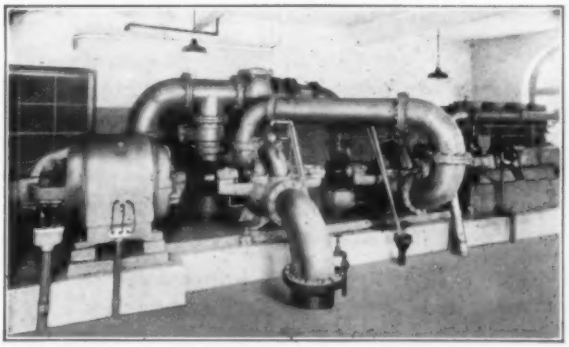
THE SLEET SEASON

Wires, whipped by the wind, crystalized at point of fastening, coated with sleet, sag under the weight suddenly let go. Cities in darkness, pumps inoperative. Three essentials of living—power—light—water unavailable! Guard against power outage with

Sterling High Duty

Sterling — The Engine of Refinement

Internal Combustion Engines



12 to 565 B. H. P.
Gas or Gasoline

For standby in emergency, Goldsboro, N. C., has two Sterling engines, one a GRC-8 cylinder 240-H.P., 1200 R.P.M. engine and a 90-H.P., 1200 R.P.M. FC-4 cylinder engine direct connected to a DeLaval centrifugal pump. Sold through J. R. Purser of Charlotte, N. C.

STERLING ENGINE COMPANY

Home Office and Plant
1270 Niagara St. BUFFALO, N. Y. Dept. C-11

Branch Office
900 Chrysler Bldg., NEW YORK, N. Y.

INCREASE YOUR REVENUE! HOLD DOWN COSTS

A-SOT SC-SOT

A sure and definite way to increase revenue is to install more water meters . . . Make your program 100% for the maximum return . . . and select Badger Meters for steady, dependable performance.

The Badger is designed practically, with simplicity its keynote. It embraces the highest of quality materials molded into few working parts . . . These parts are assembled in units which are readily accessible should service be necessary... Consequently, maintenance costs are held down to a minimum.

Let us give you detailed information concerning the Badger Meters shown above. Write for complete catalog.

BADGER METER MANUFACTURING CO.
MILWAUKEE WISCONSIN

Branches in

New York City, Chicago, Ill., Waco, Texas, Seattle, Wash., Cincinnati, O., Kansas City, Mo., Savannah, Ga., Los Angeles, Cal., Philadelphia, Pa.

BADGER Water METERS

Cast Iron Pipe

for Water and Gas

Cast Iron Pipe and Special Castings, Bell and Spigot, Flange, Flexible Joint, Culvert, Milled and Plain End Tubes, Cylinders, Flanged and Bell and Spigot Fittings, High Pressure Fire Service Pipe, Warren Short Body Specials.

Size 2- to 60-inch

Pipe manufactured in accordance with standard specifications adopted and approved by water works associations and engineers.

Warren Foundry & Pipe Corp.

formerly

Warren Foundry and Machine Co.

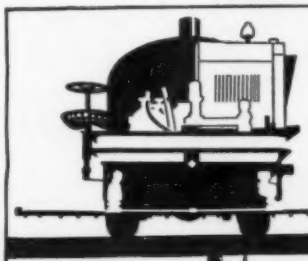
Sales: Bowling Green Building, New York City
Offices: 75 Federal Street, Boston, Mass.

Carey Elastite EXPANSION JOINT

makes *Good* Paving *Better*

The "sandwich" joint which protects concrete paving against expansion and contraction stresses. Proved by 20 years' use in highways and sidewalks in all parts of the world. Large stocks in principal cities insure immediate shipment. Write for catalog and 1933 prices.

THE PHILIP CAREY COMPANY
Department E-1 Lockland, Cincinnati, Ohio
Branches in Principal Cities



Asphalt Distributors
Asphalt Kettles
Emulsion Sprayers
Surface Heaters
Tool Boxes
Oil Burners
Lead Furnaces

THE SIGN OF A GOOD HEATER LB LITTLEFORD BROS. INC.

LITTLEFORD BROS.
500 EAST PEARL STREET
CINCINNATI, OHIO

LFC

Big Problems—an everyday routine at LYNCHBURG

This "Special" casting was a problem for any foundry. It demanded excellent foundry practice and methods as well as accurate machine work... Yet—with more than half a century of experience such "Special" jobs actually become everyday routine at "Lynchburg".... For quick estimates write, wire or phone "Lynchburg."

Bell and Spigot Pipe and Fittings. From 4" to 54"
Cast Iron Flanged Pipe. From 3" to 84"
Cast Iron Flanged Fittings and Flanges from 1" to 84"
de Lavaud Centrifugal Cast-Iron Pipe

Special Iron Castings for the Chemical Industry

LYNCHBURG FOUNDRY COMPANY
General Office · Lynchburg, Virginia
Peoples Gas Building, Chicago, Ill.
Empire State Building, New York, N. Y.

Just think... a modern, new hotel, in the heart of New York—200 feet from Broadway, on 45th Street. A room and bath for one, $2.50; for two, $3.50.

It's the PICCADILLY
45th STREET and BROADWAY • NEW YORK
WILLIAM MADLUNG, Mng. Dir.

RENSSELAER VALVES
COREY HYDRANTS

Tapping Sleeves, Tapping Valves, Crosses, Split Repair Sleeves, Post Indicators, Floor Standards, Air Valves, Valve Boxes, Grease Cases, Etc.

Write for Catalog "G"

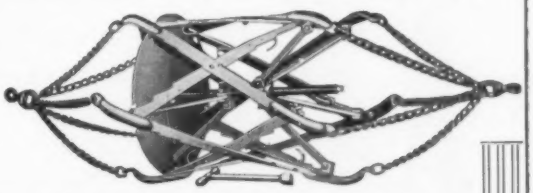
RENSSELAER VALVE CO.
TROY NEW YORK

Imagine trying to get along without sewers!

We needn't describe the picture that presents itself. Yet thoroughly clogged sewers are little better than no sewers at all.

Many cities today depend entirely on the

EXPANDING ROOT CUTTER and SEWER CLEANER (Patented)



to keep their systems functioning 100 per cent efficiently. The cost is so small.

After the root cutter has been pulled through the sewer several times, a sediment disc may be placed in the machine, forming a bucket. This arrangement will push before it all the severed roots, caked sediment, sand, gravel and obstructions to the manhole to be lifted out. Cleans the entire wall, top, sides and bottom. Double spring steel knives operate in scissorlike fashion when drawn in either direction by windlass at each manhole. No water is needed. Fitted in 30 seconds to any sewer 6 to 30 inches. Write today for catalog.

"We have used your Expanding Root Cutter and Sewer Cleaner and are well pleased. Time saved in the first week of use paid for the equipment."
—J. A. MIELKE, City Manager, Morris, Minn.

Shipped anywhere on 30 days' free trial. Satisfaction fully guaranteed.

EXPANDING SEWER MACHINE CO.
NAPPANEE, INDIANA

De Laval Pumps in the World's Largest Steam Driven Pumping Station

20 Years' Progress in Centrifugal Pumps

has included greatly increased size, reliability and efficiency.

THE Western Avenue Pumping Station at Chicago contains four DE LAVAL compound geared turbine driven pumps, each of 75 m.g.d. capacity against 150-foot head. The Howard Station in St. Louis contains two DE LAVAL turbine driven units which each deliver 60 m.g.d. against 360-foot head, two units rated at 60 m.g.d. and one unit rated 120 m.g.d. against 40-foot head.

Extremely high efficiencies are shown by De Laval centrifugal water works pumps, and such efficiencies are maintained over long periods, due to the De Laval labyrinth wearing rings, and to high grade construction.

For the "base load" operating conditions of large pumping stations, De Laval improved steam turbines and centrifugal pumps hold unsurpassed records of low cost pumping.

De Laval Steam Turbine Co.
Trenton, New Jersey

4064

VALUABLE BOOK FREE

QUINN "HEAVY DUTY" PIPE FORMS HAND OR WET PROCESS

Make concrete pipe on the job with QUINN Heavy-duty Pipe Forms. Gives more employment AT HOME where it is needed.

Quinn forms are standard in every respect, assures more uniform concrete pipe of highest quality—by our experience of 25 years in the manufacture of Concrete Pipe Equipment.

Sizes 12" to 84"—any length.
Tongue and Groove or Bell End.

Write for prices and catalog.

QUINN WIRE & IRON WORKS

1623 Twelfth St. Boone, Iowa

THE STANDARD FOR 50 YEARS

Automatic Pressure Control Valves
Feed Water Filters — Portable Fire Hydrants
Hydraulic Engines — Hydraulic Booster Pumps

ROSS VALVE MFG. CO., INC.

ARCHIBALD STREET — TROY N. Y.

The EDDY Hydrant

Eddy Fire Hydrants have many points that appeal to water-works men. For example:

A damaged valve can be replaced in a few minutes at slight expense.

Should the standpipe be broken, not a drop of water need be lost.

All hydrants are frost-proof.

These and many other points of excellence are thoroughly explained in our catalog, which it will pay you to study.

Also manufacturers of the well-known Eddy Valves

EDDY VALVE COMPANY
WATERFORD NEW YORK

Representatives
Jas. B. Clow & Sons, Chicago, Ill.
National Cast Iron Pipe Co., Birmingham, Ala.

NATIONAL METERS

EMPIRE · NASH · CROWN · GEM
EMPIRE-COMPOUND · PREMIER

NATIONAL METER COMPANY

Catalogs on request. Write to National Meter Company, 4207 First Avenue, Brooklyn, N. Y., (or nearest Branch Office in Boston, Chicago, Los Angeles, or San Francisco).

DONALDSON IRON CO.

Emaus, Lehigh Co., Pa.

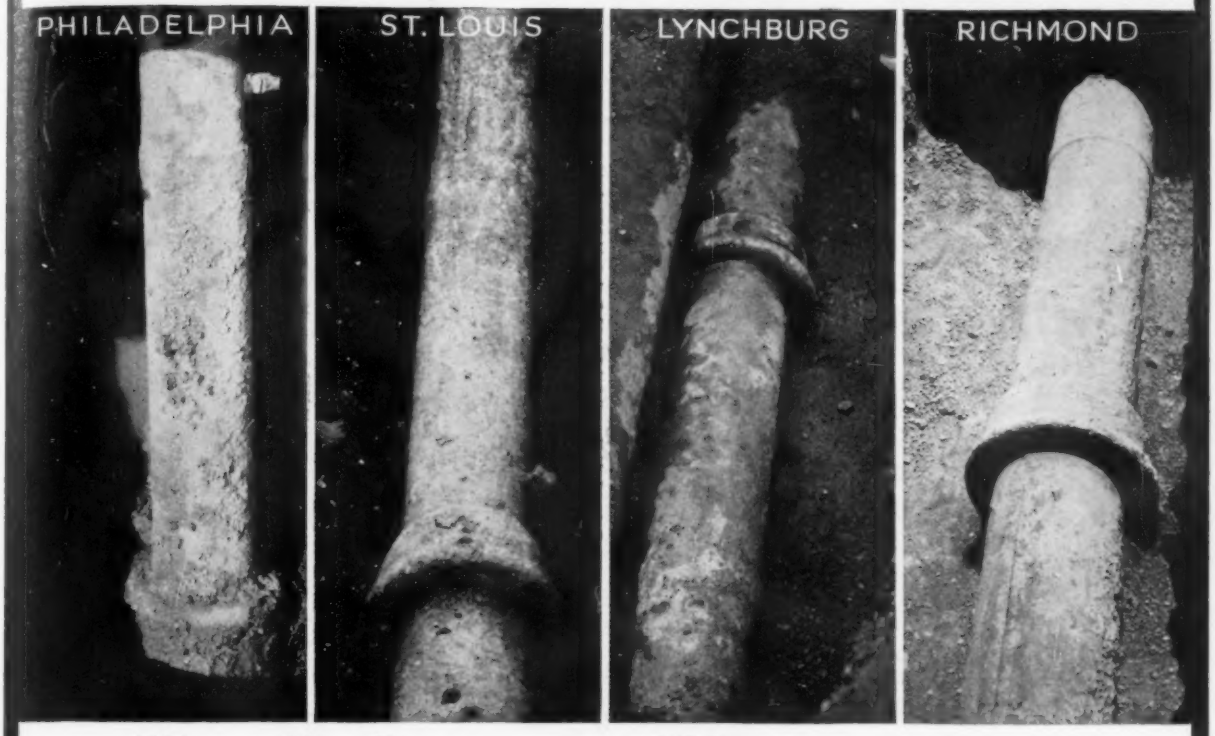
Manufacturers of

CAST IRON PIPE

FOR WATER AND GAS

ALSO SPECIAL CASTINGS AND FLANGE WORK

All of them over 100 Years old



..all of them still in service

YOU see above a group of photographs of good and faithful servants of the taxpayers of four cities. They are cast iron water mains that have been in service for 100 years or more. They have long since paid for themselves—are now and have been serving for nothing—and they have saved the citizens of these cities substantial sums in taxes or rates.

Engineers estimate, and our advertising tells you, that the useful life of cast iron pipe is a century and more. But there is nothing so convincing as evidence the eye can see. Therefore, look again at these photographs of century-old cast iron mains in actual service. These gallant old mains were uncovered for inspection by city officials and engineers—found in satisfactory condition—and then covered again to go on serving indefinitely.

In the majority of America's large cities, *original* cast iron water and gas mains are still serving and saving millions of dollars for taxpayers. Cast iron pipe need be laid but once and paid for but once.

The reason for the long life of cast iron pipe is its effective resistance to rust. Cast iron is the one ferrous metal for water and gas mains, and for sewer construction, that will not disintegrate from rust. This characteristic makes cast iron pipe the most practicable for underground mains since rust will not destroy it. For further information write to The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 309 Peoples Gas Bldg., Chicago, Ill.

Look for the "Q-check" symbol as shown above. It is the registered trademark of The Cast Iron Pipe Research Association.

CAST IRON PIPE

During June we hope you will remember to mention THE AMERICAN CITY

"LIFETIME" SIGNS

—more than a name

STREET SIGNS
TRAFFIC SIGNS
REFLECTING SIGNS AND SIGNALS

"LIFETIME" is something *more* than a good-looking, high-sounding name for just another street sign. It is the best single word we have been able to think of, to express our absolute confidence in the *durability* of our signs. We believe that our Cast Aluminum Signs are not only the most durable, but also the most effective and practical street signs manufactured at any price. We invite a comparison with any others on the market today—in appearance, utility, accuracy, cost. Street and Traffic Signs, Highway Markers, Stop Signs, Night Reflecting Signs, Danger Signals, Curb Parking Signs, Street Name Panels, School Zone Signs—all are described in our illustrated booklet *AR 133*. Write for your copy today—or submit your rough sketch for special requirements to us for suggestions and quotations.

Alloy Foundry and Signal Co.
611-613 Building and Loan Building, Saginaw, Michigan

Perchloron
HIGH TEST CALCIUM HYPOCHLORITE
Tests over 70% available chlorine. Takes the place of discarded methods. No return containers to bother with. Requires less storage space. Extremely stable. Highest available chlorine content. Rate of decomposition is negligible.
Chemicals for Industry
SULPHATE OF ALUMINA
FERRIC CHLORIDE
LIQUID CHLORINE
CHLORIDE OF LIME
Est. 1850
TRADE MARK
PENNSYLVANIA SALT MFG. CO.
EXECUTIVE OFFICES, WIDENER BLDG.
PHILADELPHIA, PENNSYLVANIA

Mention THE AMERICAN CITY—it helps.

HARNESS THE COHESIVE POWER OF WATER

TO STABILIZE YOUR ROADS

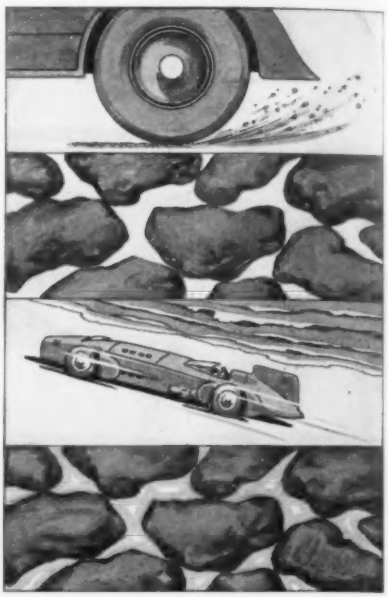
WATER, free as the air you breathe—and plentiful anywhere when simple means (Calcium Chloride) are used for drawing it out of the atmosphere—is one of the greatest soil-stabilizing elements in existence. Scientific research and engineering have recently made great progress in the utilization of *"Moisture-film Cohesion"* with unbonded-highway materials.

Q. *Why does an automobile wheel do this to loose, dry particles of road materials?*

A. Because there is no cohesive element to hold them together. Dry particles of soil, sand, gravel are unstable and slip over one another.

Q. *Why is a stretch of tidewater beach the fastest, smoothest, and one of the firmest roadways in the world?*

A. Because a cohesive moisture-film connects each grain of sand with its neighbor . . . holds them together with a tenacity which exerts tremendous compression effects.



The use of Calcium Chloride as a moisture-supplying agent is already widely known and adopted for dust laying, preventing heavy loss of surface materials and reducing maintenance costs on *any* type of unbonded road. On resurfacing work it has been proved to do an excellent job of stabilization with ordinarily available mixtures of gravel and soil fines . . . while the addition of correctly proportioned minute structure soils, such as clay, greatly increases the cohesive power of the moisture-film, to produce an unbelievably stable surface.

"MOISTURE-FILM COHESION"

—developed with Calcium Chloride treatment—helped to turn the dusty, traffic-scarred road at the left into the firm, smooth-surfaced "boulevard" at the right. Highway officials and engineers, write—*today*—for further information on road maintenance and stabilization by Calcium Chloride methods. Address any of the following members of the

CALCIUM CHLORIDE ASSOCIATION

THE COLUMBIA ALKALI CORP.
Barberton, Ohio

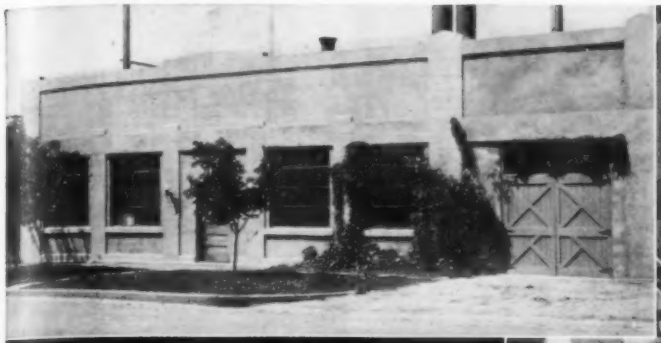
MICHIGAN ALKALI COMPANY
10 East 40th St., New York City

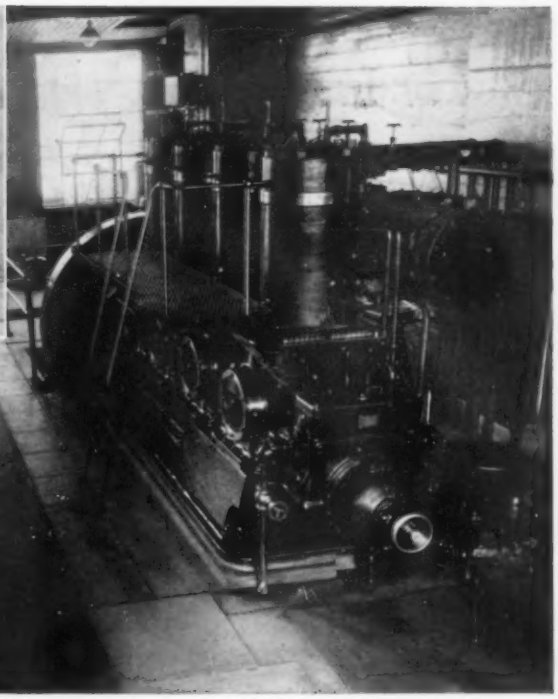
THE DOW CHEMICAL COMPANY
Midland, Michigan

SOLVAY SALES CORPORATION
61 Broadway, New York City

CALCIUM CHLORIDE FOR COMPACTING • ROAD SURFACES

During June we hope you will remember to mention THE AMERICAN CITY





WELLS, Minnesota
(pop. 1782)
Changes to F-M Diesel *and Saves*
$11,096.00
first year . . . . . .

In the winter of 1930, this city scrutinized its municipally-owned and operated steam light and power plant. ***It found a coal cost of*** 2.56 per kw.-hr.

The city's firm of consulting engineers, G. M. Orr & Co., were called upon for an engineering survey to determine a more economical method of power generation.

The survey covered: (1) New steam equipment (2) purchased power (3) Diesels. The report showed decided advantages in favor of a Diesel operated municipal plant.

Fairbanks-Morse Diesels were finally chosen on the basis of their excellent performance record in adjacent cities.

Three F-M Diesel generating units, totalling 660 horsepower were installed.

The end of the first year's operation with these units showed a net operating profit to the city of $11,096.00!

A source of revenue to the city in place of an expense! This is the customary result when F-M Diesels are installed in a city-owned plant.

Fairbanks, Morse & Co., will gladly furnish you with data on what F-M Diesels can do for *your* city. Address Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Illinois. 32 branches at your service throughout the United States.

FAIRBANKS-MORSE
DIESEL ENGINES

5883-OA98.84

POWER PUMPING AND WEIGHING EQUIPMENT

Says the Unmetered Consumer:

"Why send for the Plumber? *. . . let it drip!"*

Ewing Galloway

No individual will sit idly by and watch water drip through faulty faucets or leak through defective toilets when he knows HE is paying for water wasted.

Under the flat rate plan it's cheaper for the consumer to "let it drip"—he'd have to pay the plumber—while the city pays for the water wasted through leaking pipes or fixtures.

Good Water Meters promptly check water wastes and reduce pumping costs. The savings of one group of meters will soon finance the setting of another group.

And — if they are TRIDENT or LAMBERT Water Meters — once they are set, their interchangeable parts, sustained accuracy and low maintenance and depreciation costs mean long years of trouble-free, expenseless, perfect, continuous service. A type for every requirement. Send for catalogs to the Neptune Meter Co. (Thomson Meter Corp.), 50 East 42nd Street, New York City . . . or Neptune Meter Co., Ltd., Toronto, Ont.

One of the many types of TRIDENT and LAMBERT Water Meters — nearly 6 MILLION made and sold the world over . . .

TRIDENT STYLE 3 DISC METER

For services between the capacity of the smaller Trident Disc Meter and the larger Trident Crest, Compound or Protectus Meters. Interchangeable Parts. Oil-Enclosed Gear Train. Delivery adjustment, 40 to 100 pounds pressure.

trident

& LAMBERT WATER METERS

ANNOUNCING

A NEW LOW-PRICED 1000-WATT FLOODLIGHT

For Lighting Recreation Centers

THIS low-priced floodlight is in step with the times. It will help you to increase the usefulness of municipal parks and playgrounds — especially now, when the people of your city need recreational facilities more than ever before. In presenting it, General Electric recognizes the present need for municipal economy.

Investigate this new projector. You will find it useful for lighting tennis courts, playground baseball fields, and the like; also for lighting municipal construction projects and public works. It is easy to mount and is protected from the elements by a heat-resisting lens.

At "A Century of Progress" Exposition, 1000 of these Exposition Model Floodlights will be used. A new leaflet, GEC-104, contains further details about this and smaller floodlights. Write for a copy now. Address our nearest sales office, or General Electric, Dept. 6-201, Schenectady, N. Y.

Either a 1000- or a 500-watt general service MAZDA lamp can be used

GENERAL ELECTRIC COMPANY
Dept. 6-201, Schenectady, N. Y.

Gentlemen:

Please send me a copy of your leaflet, GEC-104, on the new Exposition Model Handy Floodlight.

Name .....

Address .....

.....

710-180

GENERAL ELECTRIC

A policeman every 50 yards!

Efficient, modern street lights are like auxiliary policemen . . . Their revealing glow drives law-breakers away They help *prevent* crime by lighting up the dark corners where crime breeds. ¶ Here's a pertinent fact. In one city crimes decreased 41 per cent in those sections where better street lighting was installed. Good street lighting makes police work easier. ¶ With well-lighted streets, traffic speeds up . . . accidents decrease . . . business improves. ¶ If there's a limited city budget to be met, an economical installation may be had through careful planning. Substantial savings may be made by checking *both* original costs and maintenance costs . . . by wise selection of standards . . . by proper spacing. ¶ These involve complex problems. Graybar's experienced street lighting specialists are both well qualified and willing to help you solve such problems.

GraybaR
STREET LIGHTING

OFFICES IN 75 PRINCIPAL CITIES. EXECUTIVE OFFICES: GRAYBAR BUILDING. NEW YORK, N. Y.

When you write for that catalog, kindly mention THE AMERICAN CITY

The American City Professional Service Directory

ALVORD, BURDICK & HOWSON
John W. Alvord — Chas. B. Burdick
Donald H. Maxwell — Louis R. Howson
Water Works — Sewage Disposal
Water Purification — Drainage
Flood Relief — Appraisals
Sewerage — Power Generation
CIVIC OPERA BLDG., CHICAGO, ILL.

ROBERT J. BARTLEY
Civil Engineer
First Nat. Bank Bldg. Bay Shore, N. Y.
Investigations, Reports, Estimates, Designs and Supervision
Waterfront Improvements, Roads and Pavements, Parks and Playgrounds, Planning and Zoning, Sewers and Drainage, Garbage Disposal, Grade Crossing Eliminations and Separations

JAMES M. CAIRD
Assoc. Am. Soc. C. E.
CHEMIST and BACTERIOLOGIST
OFFICE AND LABORATORY
Cannon Building, Troy, N. Y
Water Analysis and Tests of Filter Plants

H. Burdett Cleveland
Consulting Sanitary Engineer
Water Supply and Purification — Reports Investigation
Sewerage and Sewage Disposal — Industrial Waste Evaluation
Refuse Disposal — Design
90 Wall Street — New York

AMBURSEN CONSTRUCTION CO., INC.
Engineer-Constructors
Ambursen Dams
295 Madison Avenue, New York
Alexander Building, San Francisco

Barstow & McCurdy, Inc.
Engineers
Specializing in Sewerage, Drainage and Water-supply Works
31 N. Summit St., Akron, O.
5601 Montgomery Road Cincinnati, Ohio

CALDWELL ENGINEERING COMPANY
Consulting Engineer
Water Works, Dams, Water Purification and Softening, Sewerage and Sewage Disposal
Jacksonville — Illinois

WILLIAM R. CONARD
BURLINGTON, N. J.
Specialists on Water Works—
Materials — Inspections — Designs
Specifications — Reports — Tests

The American Public Utilities Bureau
Organized to assist municipalities and public groups in utility valuations, rates, franchises, accounting, and surveys.
JOHN BAUER, PhD., Director
280 Broadway — New York City

Kansas City, Mo. — Mutual Bldg.
BLACK & VEATCH
Consulting Engineers
Sewerage, Sewage Disposal, Water Supply, Water Purification, Electric Lighting, Power Plants, Valuations, Special Investigations and Reports.

C. R. CHADBOURNE
Consulting Engineer
Municipal Steam & Diesel Plants—Central Heating Plants—Water Works—Swimming Pools. Design—Supervision Construction—Appraisals—Reports.
6629 Ingleside Ave., Chicago, Ill.

JACOB L. CRANE, Jr.
Municipal Development Engineer
CITY AND TOWN PLANNING — ZONING
Municipal Utilities
Land Subdivisions. Housing
Wrigley Building, 400 N. Michigan Ave.
CHICAGO

E. T. ARCHER & CO.
Consulting Engineers
Steam & Hydraulic Power Plants, Water Sewerage, Paving, Roads, Appraisals Testimony Reports.
New England Bldg. — City Bank Bldg.
Kansas City, Mo. — Shreveport, La.

W. N. BROWN, INC.
Specialists
Cities Surveys
Topographic Surveys
Aerial Photographic Surveys
531 14th St., N. W., Washington, D. C.

THE J. N. CHESTER ENGRS.
J. N. Chester — D. E. Davis — J. F. Labson
J. T. Campbell — E. E. Bankson
Water Works, Water Purification, Rate Investigations and Appraisements, Sewerage, Sewage Disposal, Operation of Properties, Expert Testimony.
717 Liberty Ave. — Pittsburgh, Pa.

GEORGE C. DIEHL, INC.
Engineers
Sewage and Sewage Treatment—Water Supply—Laboratory—City and Town Planning—Grade Crossing Elimination—Bridges
Ellicott Square — Buffalo, N. Y.

BARKER & WHEELER
38 State Street — Albany, N. Y.
11 Park Place — New York City
Water Supply — Public Utility and Industrial valuations
Sewerage — and Rates
Sewage Disposal — Power

Burns & McDonnell Engr. Co.
McDonnell-Smith-Baldwin-Lamber
Consulting Engineers
Waterworks, Sewerage, Lighting, Appraisals, Rate Investigations.
Kansas City, Mo. — Interstate Bldg.
Los Angeles, Cal. — West Pacific Bldg.

Chicago Testing Laboratory
Incorporated
affiliated Chicago Paving Lab., Inc.
Hugh W. Skidmore — Gene Abson
MATERIALS — PROCESSES
STRUCTURES
Consultation, Inspection, Testing, Design, Research, Investigation.
536 Lake Shore Drive — Chicago

FAY, SPOFFORD and THORNDIKE
Consulting Engineers
Port Development — Bridges — Water Supply — Drainage — Sewerage — Fire Prevention
44 School Street — Boston

Contractors to Federal and State Departments, County and Municipal Governments — Large Corporations — Private and Industrial Interests
We have mapped from the air, 61 Municipalities Cooperating with Consultants and Engineers
ABRAMS AERIAL SURVEY CORPORATION
LANSING — *Mapping since 1922* — MICHIGAN
Submit Projects for Contract Price
Send for our folder "The Third Dimension in Aerial Photography"

THE WILLIAM T. FIELD ENGINEERS, INC.
Consulting Engineers
William T. Field — Arthur H. Emerson
Sewerage Systems and Treatment, Water Supply and Purification, Investigations, Appraisals, Design, Supervision, Laboratory.
Flower Bldg. — Watertown, N. Y.

AIRMAP CORPORATION OF AMERICA
Aerial Surveys and Maps—Consultants and Engineers
The AIRMAP—The Engineer's Aerial Map for City Planning, Zoning, Water Supply, Studies, Complete Aerial Tax Map Service
Aerial Photography in All Its Phases — Sperry Bldg., Brooklyn, N. Y.

WALTER H. FLOOD & CO.
Chemical Engineers
Paving and Engineering Materials—Inspections — Reports — Specifications — Physical and Chemical Tests — Design and Control of Asphalt and Concrete Mixtures.
822 E. 42nd St., Chicago, Ill. — 321 Daniel Bldg. Jackson, Miss.

THE J. M. CLEMINSHAW COMPANY
Appraisal Engineers
Tax — Equalization — Service
Revaluations of Municipalities for local tax purposes. Certified Appraisals of Public Utilities, Municipal Buildings and Equipment for Insurance, Financial and Accounting Purposes.
216 Superior Avenue, N. E. — Cleveland, Ohio

JOHN A. FOULKS
CONSULTING ENGINEER
18-20 Beaver St. — Newark, N. J.
Specialist in Municipal Engineering and Public Improvements, including Organization Management, Investigations, Reports, Plans, Estimates, Specifications and Supervision.

FULLER & McCLINTOCK
Engineers
George W. Fuller — James R. McClintock — F. G. Cunningham
Elmer G. Manahan — C. A. Emerson, Jr. — W. Donaldson — E. W. Whitlock
Water Supply, Water Purification, Sewerage, Sewage Disposal, Garbage and Industrial Wastes Problems, Valuations and Rate Regulation of Public Utilities
New York, 170 Broadway

J. A. CONKLIN
G. A. GIORLOFF
Airports, Highways, Pavements, Town Planning and Zoning, Water Supply, Sewerage, Drainage.
Reports, Estimates, Surveys, Design Supervision.
154 Nassau St. — New York City

FULLER AND EVERETT
CIVIL, HYDRAULIC and SANITARY ENGINEERS
WATER SUPPLY and SEWERAGE
W. E. Fuller — C. M. Everett
22 E. 40th St. — New York

CHARLES C. HOPKINS
Consulting Engineer
349 Cutler Bldg. — Rochester, N. Y.
Water supply and purification. Sewerage, Wastes disposal. Municipal Engineering, Expert testimony and appraisals. Plans, Estimates, supervision.

Arthur L. Mullergren
Consulting Engineers
Specialist in Electric Light, Power and Water Pumping
802 Fairfax Building
Kansas City, Mo.

CLYDE POTTS
30 Church St. — New York
Civil and Sanitary Engineer
Sewerage and Sewage Disposal Works, Hydraulics, Water Works, Filtration, Reports, Plans and Estimates.

Gascoigne, George B.
Consulting Engineer
W. L. Havens — A. A. Burger
F. W. Jones — F. C. Tolles
Sewerage and Sewage Disposal
Water Supply and Purification
Treatment of Industrial Wastes.
Cleveland, — Leader-News Building

R. HUSSELMAN
CONSULTING ENGINEER AND PUBLIC UTILITY CONSULTANT
Design and Construction
Valuations and Expert Testimony
Rate Investigations and Reports
310 Hippodrome Bldg., CLEVELAND, O.

PATZIG TESTING LABORATORIES
Inspection Service
Chemical and Physical Testing of Paving and Building Materials, Metals, Fuel, Oils, Water Etc.
2215 Ingersoll Ave. — Des Moines, Iowa

R. H. Randall & Co., Inc.
Engineers
1607 Canton St., Toledo, O.
Geodetic and topographic surveys and maps of large areas. Services rendered include over ninety per cent of American CITY SURVEYS

J. WALLACE HIGGINS
Assoc. M. Am. Soc. C. E.
CIVIL AND LANDSCAPE ENGINEER
Municipal Engineering, Sewerage, Parks, Cemeteries, Subdivisions, Topographic Surveys, Title Surveys, Estimates, Supervision
70 East 45th St. — NEW YORK

LOUIS T. KLAUDER
Consulting Engineer
Municipal Power—Light—Heat
Appraisals—Reports—Construction—Operation
PHILADELPHIA — TRENTON
JAMESTOWN, N. Y.

Pearse, Greeley & Hansen
Hydraulic & Sanitary Engineers
Reports, Designs, Supervision, Appraisals, Water Supply, Sewerage Water Purification, Sewage, Treatment, Refuse Disposal
Chicago, Ill., — 8 N. Michigan Avenue

CUTHBERT E. REEVES
Valuation Engineer
Investigations and Reports upon Assessments and Assessment Standardization. Valuations for all Municipal Purposes.
Liberty Bank Bldg. — Buffalo, N. Y.

NICHOLAS S. HILL, JR.
Consulting Engineer
Water Supply, Sewage Disposal, Hydraulic Developments, Valuations and Reports.
Chemical and Biological Laboratories.
112 East 19th Street — New York City

MORRIS KNOWLES, INC.
Engineers
Water Supply and Purification, Sewerage and Sewage Disposal, Valuations, Laboratory, City Planning.
PITTSBURGH, PA.

ARTHUR N. PIERSON
Consultant and Technical Advisor—Public Affairs
60 Park Place, Newark, N. J.

Robinson & Steinman
Consulting Engineers
Bridges:
Design, Constructions, Strengthening, Investigations, Reports.
New York, — 117 Liberty St.

HINE, GOLDTHWAITE & MYLOTT
Engineers and Accountants
Public Utilities
7 Dey Street — New York

CHAS. F. MEBUS
M. Am. Soc. C. E.
Municipal Engineering, Sewerage, Drainage, Sewage Treatment, Water Supply, Town Planning, Street Paving and Valuation. Supervision of Construction.
112 So. Easton Road — Glenside, Pa.

MALCOLM PIRNIE
Engineer
Malcolm Pirnie — Charles F. Ruff
Water Supply Treatment, Sewerage Reports, Plans, Estimates, Supervision and Operation, Valuation and Rates.
25 W. 43rd St., — New York, N. Y.

HENRY J. SAUNDERS
Consulting Engineer
Mem. Am. Soc. C. E.
Utility Rate Valuations and Analyses. Statistical and Accounting Surveys. Expert Testimony
643 Transportation Bldg.
Washington, D. C.

CHANGED YOUR ADDRESS?
If so, please notify the publishers as we are anxious to have your card in this Directory, correct. Thank you.

METCALF & EDDY
Engineers
Water, Sewage, Drainage
Refuse and Industrial Waste Problems
Valuations, Laboratory
Statler Bldg. — Boston

CLARENCE D. POLLOCK
Member Am. Soc. C. E.
Consulting Engineer
Pavements, Highways, Drainage, Sewerage, Town Planning and General Municipal Problems.
Reports, Specifications, Supervision
Park Row Bldg. — New York City

SCOFIELD ENGINEERING CO.
Philadelphia
Consulting Engineers
Municipal Improvements
Water, Gas and Electric Plants
Valuations and Appraisals

MAC ELWEE & ASSOCIATES, INC.
Industrial and Civil Engineers
Port Developments, Piers, Airports, Industrial Surveys, City Planning and Zoning, Water Front Reclamation, Investigations, Reports, Design.
134 Main St., Cambridge, Mass. — 11 West 42nd St., New York

STILLMAN & VAN SICLEN
Incorporated
Chemical and Highway Engineers
Analyses and Tests of Asphalt Paving Materials, Bitumens, Road Oils, Cement and Concrete. Specifications and Plans Drafted. Investigations, Reports and Inspection Service. Core Borings.
227 Front St. — New York City

THE PITOMETER COMPANY
Engineers
Water Waste Surveys — *Trunk Main Surveys* — *Water Distribution Studies* — *Penstock Gaugings*
52 Church Street — New York

HENRY W. TAYLOR
Consulting Engineer
Water Supply and Sewerage
Hydraulic Development
Diesel Power
11 Park Place — New York

ALEXANDER POTTER, C.E.
Hydraulic and Sanitary Engineer
50 Church Street — New York
(Hudson Terminal) — Telephone, Cortlandt 7-3195

TECHNICAL ADVISORY CORPORATION
Consulting Engineers
City Planners
15 Park Row — New York

UNIVERSAL AUDIT COMPANY
Specialists in Municipal Auditing, Accounting, Financing and Related Engineering Problems
Accountants and Auditors—Industrial Engineers
Singer Building — (BArclay 7-2272) — New York

ISAAC S. WALKER
Consulting Engineer
Examination and Reports. Design and Supervision. Water Works Filtration Plants. Sewerage, Sewage Treatment. Appraisements. Rate Investigations. Utility Management
750 Drexel Bldg. — Philadelphia, Pa.

Weston & Sampson
Consulting Engineers
Hydraulic and Public Health Engineering
Engineering and Laboratory Investigations.
Supervision of Purification Plants.
14 Beacon St. Boston, Mass.

Wiedeman & Singleton, Inc.
(Successors to Paul H. Norcross)
Consulting Engineers
Water Works, Sewers, Sewage Disposals, Appraisals, Valuations Reports
Candler Bldg. Atlanta, Ga.

CHANGED YOUR ADDRESS?
If so, please notify the publishers as we are anxious to have your card in this Directory, correct. Thank you.

MARK WOLFF, C.P.A.
Municipal Auditor and Public Utility Consultant
Companies: Electric, Gas, Telephone, Traction, Water
Services: Investigations, Rate Studies, Valuations, Reports, Expert Testimony
261 Broadway, New York

BOBBINK & ATKINS
ROSES
EVERGREENS
Ask for Catalog — RHODODENDRONS, TREES AND SHRUBS, OLD-FASHIONED FLOWERS, FRUIT TREES AND BUSHES — *Visit Nursery*
RUTHERFORD NEW JERSEY

WHOLESALE NURSERIES
Those interested in city parks, streets, cemetery planting, are especially invited to visit our nursery.
Special prices on large orders.
W. & T. SMITH COMPANY
1000 Acres GENEVA, N. Y.

Mayflower
PLYMOUTH

One of New England's Finer Hotels on the Ocean at Manomet Point

Surprisingly Inexpensive

SPECIAL VACATION TOUR
9 days — $60.00
All expense including Bus from New York

Beautiful Beach—Surf Bathing—Swimming Pool—Golf—Tennis

A VACATION PARADISE ON CAPE COD BAY

THE MAYFLOWER HOTEL
HYANNIS, MASS.
Cape Cod's Newest Hotel
also under
Charles A. Dooley Management

SEND FOR ILLUSTRATED BOOKLET AND FOLDER

DE WITT OPERATED HOTELS

De Witt Operated Hotels
feature
Unusually Comfortable Rooms, the Finest of Foods
and
Rates from
$2.50 Single, $3.50 Double

IN CLEVELAND IT'S THE HOLLENDEN

In CLEVELAND It's The
Hollenden
1050 Rooms, all with Bath
4-Station Radio Speaker in Every Room

IN CHICAGO IT'S THE LA SALLE

In CHICAGO It's The
La Salle
"The Hub of the Loop"
1000 Comfortable Rooms

IN COLUMBUS IT'S THE NEIL HOUSE

In COLUMBUS It's The
Neil House
650 Rooms, all with Bath
Radio Speaker on Request

IN AKRON IT'S THE MAYFLOWER

In AKRON It's The
Mayflower
450 Rooms, all with Bath
4-Station Radio Speaker in Every Room

De Witt Operated Hotels
are Located in the Heart of their Respective Cities

Boston, Mass.—
Hotel Kenmore
Commonwealth Avenue at Kenmore Square

EACH room has its own private bath consisting of tub, shower and filtered circulating ice water. Moderately priced Coffee and Grill Room—Always ample parking space.

Write for booklet "Vacation in New England."

400 Rooms FROM $3.00 DAILY

The American City

This index is published as an aid to the reader, but the publishers assume no responsibility for errors or omissions.

For Directory of Consulting Engineers, Landscape Architects, etc., see pages 99, 100, 101.

Index of Advertisers

*Abrams Aerial Survey Corp 99
Airmap Corporation of America 99
Allis-Chalmers Mfg. Company 19, 20
Alloy Foundry & Signal Company 36
American Tel. & Tel. Company 78

*Badger Meter Mfg. Co. 32
*Barrett Co., The 84
Bobbink & Atkins 101
Buffalo Meter Co 8
*Buffalo-Springfield Roller Co 96

*Calcium Chloride Association 38
Carey Co., The Philip 32
Cast Iron Pipe Research Association 35
Chapman Valve Manufacturing Co. 8
Chevrolet Motor Company 86
Chicago Bridge & Iron Works 6
*Cleminshaw Co., The J. M. 99
*Coldwell Lawn Mower Co 88
*Columbia Alkali Corp., The 38
*Columbian Iron Works 22
Copper & Brass Research Assn 21
*Cyclone Fence Company 90

De Laval Steam Turbine Co. 34
Dolge Company, The C. B. 90
Donaldson Iron Co. 34
*Dow Chemical Company, The 38
Duers Signal Company, Inc 88

*Eddy Valve Co 34
*Expanding Sewer Machine Co 33

*Fairbanks, Morse & Co 39
Farnan Brass Works Company, The 30
*Ford Meter Box Co 30
*Fuller & McClintock 99

*Gamewell Co 16
*General Electric Co 97
General Illumination Engineering Co. 96
*Gleason-Tiebout Glass Company 94
*Gohi Culvert Mfrs., Inc 25
Golden-Anderson Valve Specialty Co. 31
Graybar Electric Company 98

Hersey Manufacturing Company 23
Hetherington & Berner, Inc 96
Hollenden Hotel 101

Kenmore Hotel 101
*Kennedy Valve Mfg. Co., The 14

LaSalle Hotel 101
*Layne & Bowler, Inc 4
*Littleford Bros 32
Lock-Joint Pipe Co 30
*Ludlow Valve Mfg. Co 29
*Lyle Signs, Inc 96
Lynchburg Foundry Co 33

*Mac Elwee & Associates, Inc 100
McIntosh & Seymour Corporation 28
McWane Cast Iron Pipe Co 30
*Mathieson Alkali Works, Inc 105
Mayflower Hotel 101
Mayflower, The (Hotel) 101
*Michigan Alkali Company 38
Miller Power Lawn Mower Co., The 90
*Mine Safety Appliances Company 29
*Mohawk Asphalt Heater Co. 90

National Meter Co. 34
National Paving Brick Assn 82
*National Water Main Cleaning Co 103
Neil House, The 101
*Neptune Meter Co 40

Outdoor Lighting Section 93

*Pennsylvania Salt Mfg. Co. 37
Piccadilly Hotel 33
*Pitometer Co., The 28, 100
*Pittsburgh-Des Moines Steel Co 12
*Pittsburgh Equitable Meter Company 104
*Potter, Alexander 100

Quinn Wire & Iron Works 34

*Rensselaer Valve Co. 33
*Ross Valve Mfg. Co., Inc 34

*Simplex Valve & Meter Co. 10
Smith Company, W. & T. 101
*Smith Manufacturing Co., A. P. 18
*Solvay Sales Corporation 38
*Standard Oil Co. of N. Y., Inc 24
Sterling Engine Co. 31
*Stewart Iron Works Co., Inc., The 96
Superior Sheet Steel Company 88
Sweet's Steel Co 30

*Texas Company, The 2
*Thomson Meter Corp 40
*Toledo Pressed Steel Co 96

*Universal Audit Co 100

Vogt Bros. Manufacturing Co 30

*Wallace & Tiernan Company, Inc. 106
Warren Foundry & Pipe Corp 32
Welsbach St. Lighting Co. of America 92
*Wood & Company, R. D. 27
Worthington-Gamon Meter Company 80

** In addition to the advertisements which will be found in this issue of THE AMERICAN CITY on the pages as indicated above, condensed catalogs of those marked * will be found in THE MUNICIPAL INDEX, the big reference volume for city, town and county officials published by THE AMERICAN CITY, 470 Fourth Ave., New York. If you do not have a copy of THE MUNICIPAL INDEX, please write to the publishers.*

The Municipal Index

Introducing

The N.W.M. Field Staff

We present this page as a token of our respect for our able staff of Superintendents. These men have been in our employ for many years, have handled many hundreds of water-main cleaning jobs, and are well known throughout their respective territories for their efficient service. They are ready to serve you wherever you are, anywhere in the United States.

No city is too far away—no city, town, village or hamlet too small—to benefit financially through having its clogged mains cleaned by THE NATIONAL METHOD.

Which of these Superintendents is nearest to *your* City? Let him bring his equipment and clean your clogged pipe thoroughly of all deposits of animal, vegetable and mineral matter that have congregated on its lining and have partially or wholly destroyed its effectiveness as a water-carrier. *Remember: A clogged main is always an expensive main* (if allowed to *remain* clogged).

If desired, *we* furnish only the *Superintendent* and the *equipment*, *you* furnishing the helpers from your own ranks of laborers, employed or unemployed—to dig the holes, cut the pipe, and so forth, at the places where the pipe-cleaning machine is inserted and where it emerges from the pipe with its work completed.

We shall be glad to quote costs for cleaning any specified lengths of pipe, or to answer any questions about THE NATIONAL METHOD of water main cleaning and its results.

THE NATIONAL METHOD

THE NATIONAL WATER MAIN CLEANING CO.

FIFTY CHURCH STREET NEW YORK CITY

© 1933 by H. M. Pettit, Evanston, Ill.
Rand McNally & Company, Chicago, Publishers and Distributors

Be sure to visit A Century of Progress at Chicago. See our exhibit in the General Exhibits Building. And, en route visit our Pittsburgh factories, and our physical and chemical laboratories where you will see a half century of progress in the meter industry.

Congratulations to Chicago on its marvelous exposition depicting A Century of Progress! The Pittsburgh Equitable Meter Company, founded by the late George Westinghouse a half century ago, has contributed to and benefited by Chicago's progress.

Many thousands of Pittsburgh water meters are measuring the water used in the city of Chicago.

A TELEMCO GAUGE, a recently developed product of this company, records by remote indication the height of the water in the exposition grounds storage reservoir. A duplicate of this gauge will be in operation in our booth at the exposition, demonstrating this scientific method of remote indicating.

Pittsburgh meters not only measure water in Chicago but also the gas used in many homes and industries and the oil and gasoline used in automobiles and for domestic and industrial oil heating. Nordstrom Valves and other Pittsburgh Equitable products control the gas in the great pipe line which brings Texas gas to Chicago homes, Illinois industries and this exposition.

PITTSBURGH EQUITABLE METER CO.
MERCO NORDSTROM VALVE CO.
Branch Offices and Warehouses in Principal Cities

Protect your Patrons

While in the water...

● *Below* — Handsome Spanish-style clubhouse overlooking the Municipal Swimming Pool at Port Richmond, Staten Island, N. Y. HTH and Mathieson Liquid Chlorine help to keep this pool sanitary and inviting at all times. *Left* — Another view of the same pool showing diving towers.

...and around the pool!

When you provide safe water in your pool, you win half the battle for safe and sanitary swimming. But only half. There are other sources of contamination about the pool premises which you must guard with equal care. • Locker-room floors and benches, showers, toilets, walkways, diving boards, ladders...all these are lodging places for germs and fungus organisms. To provide *complete protection*, all of them should be thoroughly disinfected daily with HTH. HTH not only kills bacteria, but destroys all disagreeable odors, and results in a swimming place that *is* clean and *smells* clean. • Many pool operators use HTH in chlorinated footbaths. They find it highly effective in preventing the spread of "Athlete's Foot." HTH is also used in treating filters and as a reserve chlorine supply in case of increased loads or failure of standard chlorinating equipment. • Start now to give your patrons this easy, economical, effective protection. Send today for new revised edition of 24-page booklet *Keeping the Pool Safe and Sanitary*.

The MATHIESON ALKALI WORKS *(Inc.)*
250 Park Avenue New York, N. Y.

Soda Ash . . . Liquid Chlorine . . . Bicarbonate of Soda . . . HTH and HTH-15 . . . Caustic Soda . . . Bleaching Powder . . . Ammonia, Anhydrous and Aqua . . . PH-Plus (Fused Alkali) . . . Solid Carbon Dioxide

HTH is a stable, dry, readily soluble calcium hypochlorite, more than twice as concentrated as ordinary chlorinated lime. HTH retains its high strength in warm weather and during long periods of storage. It is shipped in cases of one dozen 4-lb. cans and in boxes of two 40-lb. cans.

●

MAIL COUPON FOR NEW BOOKLET

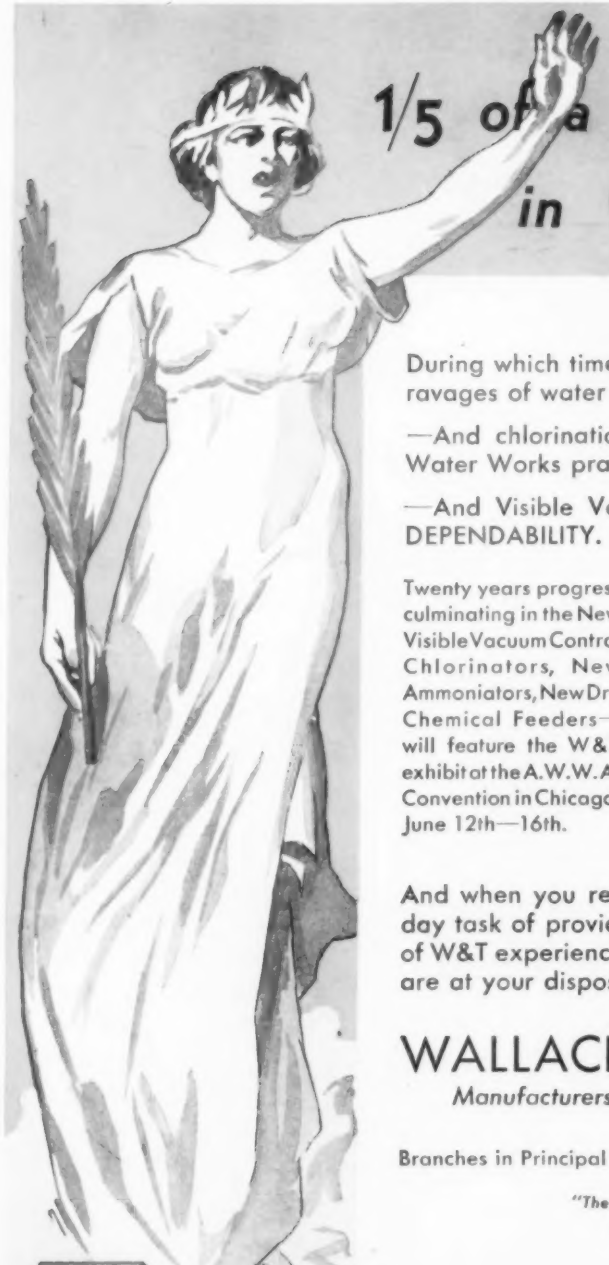
The Mathieson Alkali Works *(Inc.)*
250 Park Avenue, New York, N. Y.

Please send the new edition of booklet, "Keeping the Pool Safe and Sanitary."

Name.....

Address.....

City..... *State*.....



1/5 of a Century of Progress in CHLORINATION

During which time over 350,000 lives have been spared from the ravages of water borne intestinal disease.

—And chlorination with W&T equipment has become standard Water Works practice.

—And Visible Vacuum Control has come to be a symbol for DEPENDABILITY.

Twenty years progress culminating in the New Visible Vacuum Control Chlorinators, New Ammoniators, New Dry Chemical Feeders—will feature the W&T exhibit at the A.W.W.A. Convention in Chicago, June 12th—16th.

See the 85 W&T Visible Vacuum Control Chlorinators in service on Chicago's public water supply. See the 113 other W&T chlorinators sterilizing public and private swimming pools, disinfecting sewage or performing allied sanitary or industrial services in Greater Chicago today.

When reviewing "A Century of Progress" on Water Works Day at the World's Fair, see how Visible Vacuum Control helped exposition authorities solve their water works problems.

And when you return from Chicago to be faced with the day by day task of providing PURE, SAFE water—this same twenty years of W&T experience,—this 1/5 of a Century of Chlorination Progress, are at your disposal.

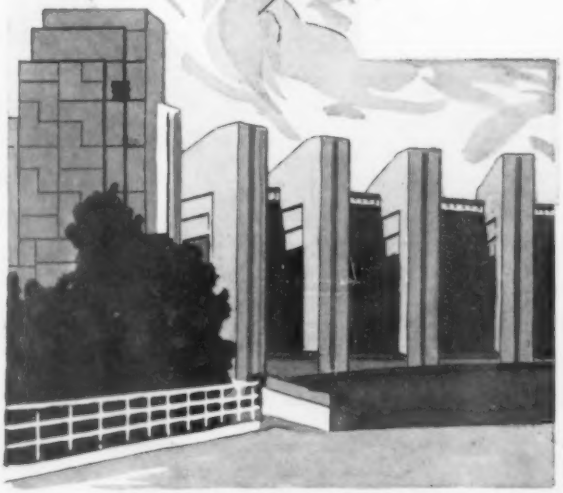
WALLACE & TIERNAN CO., Inc.

Manufacturers of Chlorine and Ammonia Control Apparatus

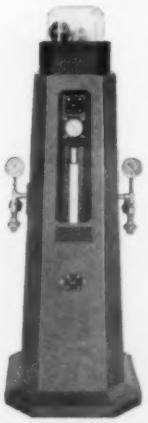
NEWARK, NEW JERSEY

Branches in Principal Cities — Main Factory — Belleville, N. J.

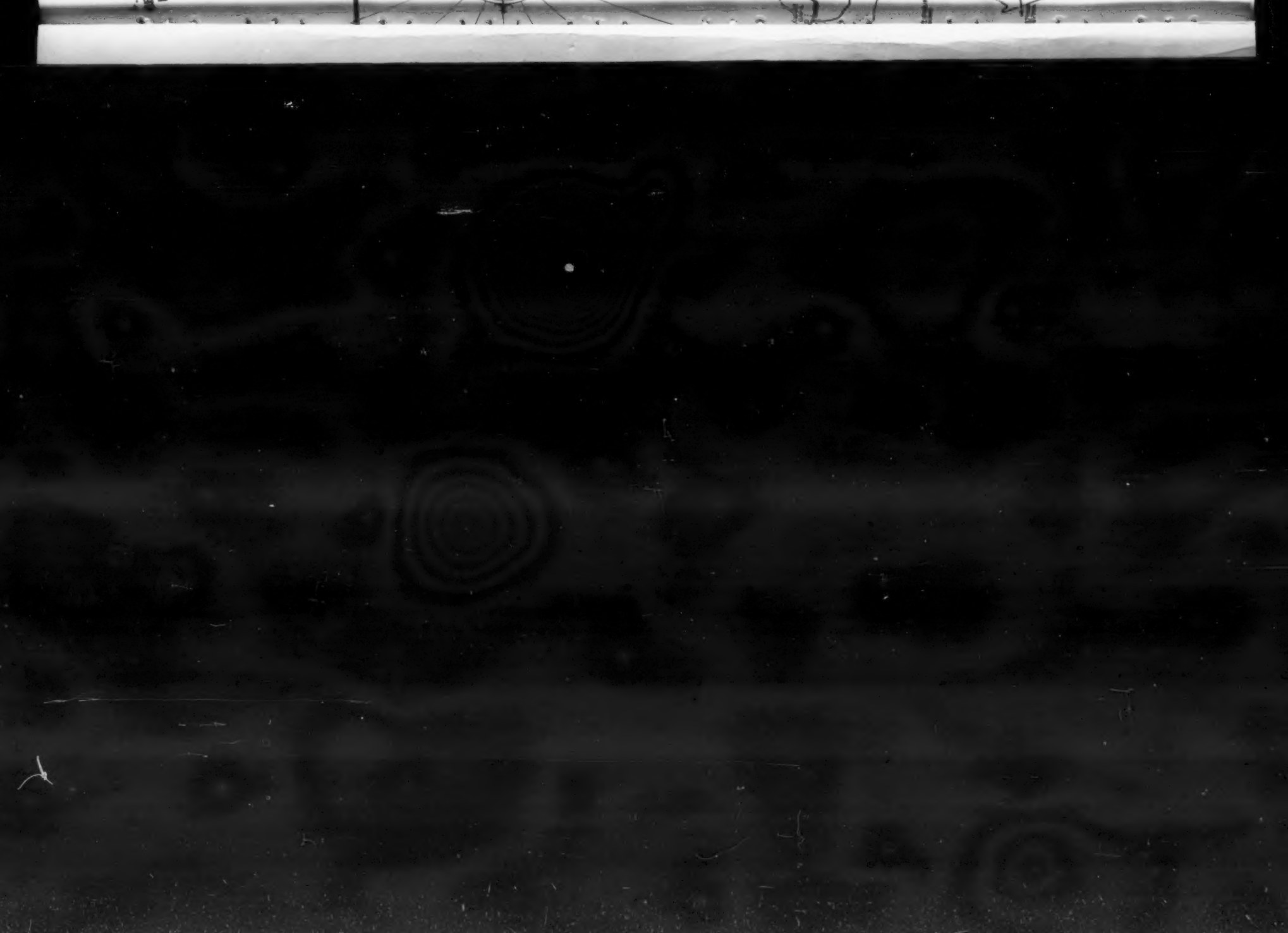
"The Only Safe Water Is a Sterilized Water"



"Rotor" Visible Vacuum Chlorinator



"Equiscale" Visible Vacuum Chlorinator



35 Cents, $2 a Year

JULY, 1933

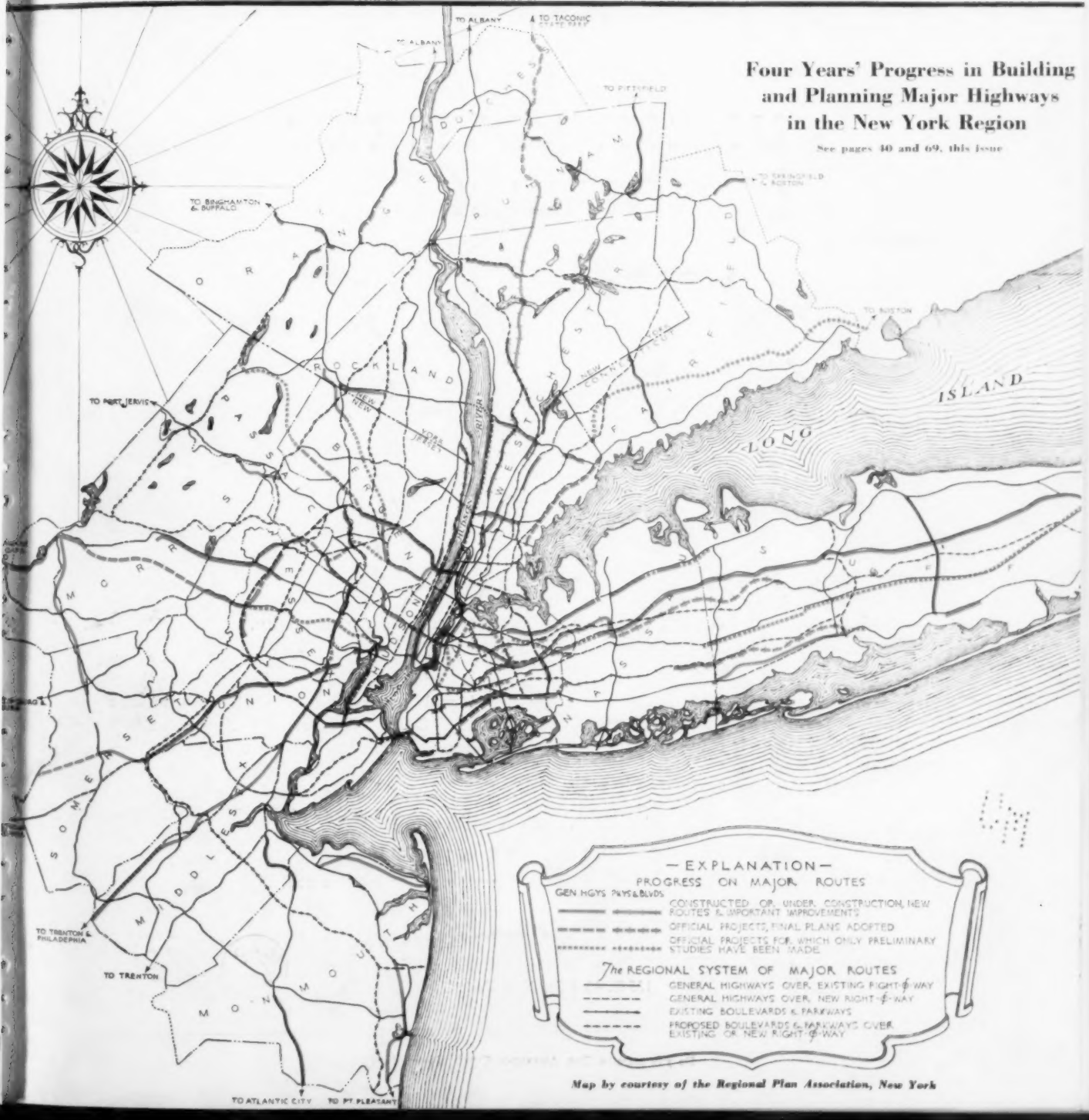
...ODICAL ROOM
GENERAL LIBRARY
UNIV. OF MICH.

JUL 10 1933

The American City

Four Years' Progress in Building and Planning Major Highways in the New York Region

See pages 40 and 69, this issue



Map by courtesy of the Regional Plan Association, New York